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AVIATION SAFETY

HEARINGS

BEFORE A

SUBCOMMITTEE OF THE COMMITTEE ON INTERSTATE AND FOREIGN COMMERCE HOUSE OF REPRESENTATIVES

EIGHTY-SECOND CONGRESS

SECOND SESSION

ON

MEASURES DESIGNED TO INSURE GREATER SAFETY TO THE PUBLIC BOTH IN THE AIR AND ON THE GROUND

FEBRUARY 1, 5, 14, 15, 19, 25, MARCH 3, 10, 12, AND 18, 1952

Printed for the use of the Committee on Interstate and Foreign Commerce

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AVIATION SAFETY

FRIDAY, FEBRUARY 1, 1952

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE OF THE COMMITTEE ON
INTERSTATE AND FOREIGN COMMERCE,
Elizabeth, N. J.

(The following testimony is only the portion that was taken in public hearings. Many closed or executive hearings were necessary because the information received was of a confidential nature. Testimony taken at those hearings will not be printed.)

Mr. BECKWORTH This subcommittee of the House Interstate and Foreign Commerce Commission was appointed last Friday after it had been determined that the series of accidents that we are having are of such great national concern. One of the things that this committee has prided itself in doing, speaking for the committee as a whole, is doing everything within its power to promote safety. For many years, this committee has considered all phases of aviation legislation. Uppermost in our minds has been safety. We are in deep sympathy with your people of this area. They certainly recognize the great seriousness of the incidents that have taken place here. We recognize, too, our responsibility in trying to bring about the constructive measures that would help to prevent the kind of incidents from which you have so dreadfully suffered. We are fortunate indeed to have some very able and experienced men on our committee. One of them comes from your great State of New Jersey, one of the most experienced men on our committee, and one who has served for many, many years in Congress, and one who has spent many, many years with the reference to aviation.

Mr. WOLVERTON. There is little that I can add to what has been said by our chairman. After our appointment as a special committee to study these circumstances that have brought about this tragic situation, we trust that all persons here today will give suggestions. This committee has a very real and sincere desire to ascertain all of the facts that will enable it to make a report to the Congress. We realize that situations of this kind present very difficult problems that must be given very thorough examinations. This committee must at all times act from the standpoint of national interest. We wish to assure you that we will give the most careful and considerate examination of every available fact and factor that has a relationship to safety from a standpoint of air transportation. This is not an easy task. The cooperation that has come from this city and county authorities has been outstanding; in fact, it has been stated that never before has a greater amount of cooperation and assistance been given, and we cer-

tainly have had that experience. I would like to mention that Clifford Case, for whom we have such a high regard and respect, has shown tremendous interest and has been of great assistance to us. I wish to assure you that the desire of this committee is to do that which will be most helpful in matters of this kind and to give them our most careful and considerate judgment.

Mr. BECKWORTH. The first witness will be Mr. Case, whose name has already been mentioned. Since you are familiar with the people who are interested, the organizations who are interested, we are going to ask you to help us to determine who will be here and at what time in the course of the hearings. Mr. Case, you may proceed to say that which you desire to say.

STATEMENT OF HON. CLIFFORD P. CASE, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF NEW JERSEY

Mr. CASE. Mr. Chairman, members of the committee, it is a great satisfaction for me to be with my distinguished colleagues in the county. I am sorry that the occasion is an occasion that has been created here. We are grateful, too, for the speed in which the House of Representatives, as represented by your committee, has shown its deep interest in and determination to help in this situation. It is a situation which has been, for a long time, a series of irritation and apprehension to the people of this area, our county and adjoining Essex County, and the people who live in this area in the number of millions, I would say, have been concerned. But now, owing to these crashes and the last, almost fatal accident, the whole area has been affected, because the plane circled over this area before it came down, where it hurt no one, by good fortune.

Now the situation is one of utter terror and we are glad you are here recognizing the seriousness of it in this area. This is a situation which is the concern of everyone, all groups in this community, Elizabeth and the surrounding towns in that section of Newark which are affected deeply, and they are united in the determination that everything possible must be done to eliminate the hazards which the airport and the flights present to the people of this area. We have business interests, we have Republicans and Democrats, united, as this hearing will show. The purpose of this official hearing is not to take technical testimony. The fact that you are here so quickly after the accident indicates that you realize that could not be done. We are having prepared extensive testimony on all phases of this thing which we will present to you as soon as we are prepared to do so. In that connection I will say that the committee which has been organized and headed by Kenneth C. Hand are engaged in that work and have been for some time prior to the accident and that will be presented to you in due course as a basis for the final determination. One of the very important things that the people of this community need is the assurance that matters will not only be investigated but that action will be taken. They are not reassured by statements of various Government agencies that they do not have authority to act. One of the most important things to allay the terror that exists is for every agency which has power to deal with the situation, to express its determination that that power will be used. I know that through you,

the House of Representatives in Congress, and a similar investigation is being instituted by a special committee of the Senate, and through you you will be able to express, as you have already done, the determination that the Federal Government, its legislative and other divisions, will take every possible action and, altogether, this problem can be solved.

One particular thing I would like to mention is this, the community is disturbed by a fear that the attitude of the people in charge of this operation do not sufficiently understand its importance. We understand, of course, that they look at matters from a different angle, but to us the time has come for a reexamination of the most searching questions, including the relocation of the airport, and we are not reassured, while this examination is not included, of what is going on. Plans are going on unabated for the expansion of the airport building, only announced last Monday when this committee was here on a private examination that a bus terminal was being built on the west side of Manhattan to serve as a center for busses to take passengers to and from the Newark Airport, and I would suggest that, with the interests at my command that if you feel as we do, the prestige of this matter should be emphasized. That those expansion programs do not continue until this investigation is complete.

I do not want to take more of your time but I do want to present to you for the record, telegrams I received from several of our colleagues in this area. Mr. Kean sends a telegram regretting that his trip to California prevents his being here. I also have telegrams from Mr. Osmers and Mr. Addonizio.

STATEMENT OF DOMINIC A. CAVICCHIA, DEPUTY ATTORNEY GENERAL, STATE OF NEW JERSEY

Mr. CAVICCHIA. Mr. Chairman, and members of the committee, I am here as Congressman Case said, as a deputy attorney general. I am here at the instructions of Attorney General Theodore D. Parsons, who heads the department of law of the State of New Jersey, and, as head of that department, has a very deep interest in this proceeding before your committee. May it be stated in the record that I am here for him and for the department, merely as an observer and I shall observe with keen interest what transpires here and bring back to the attorney general, the rèsumé of the proceedings. May I ask Mr. Chairman, if the hearing is to be transcribed, whether in the event it is transcribed, it will be possible to obtain a copy of the transcript.

The CHAIRMAN. The chairman would know of no reason why the attorney general should not have a copy of the record.

STATEMENT OF KENNETH C. HAND, NEW JERSEY STATE SENATOR

Senator HAND. Mr. Chairman, Congressman Case, and members of the committee. It is indeed a privilege to welcome you here this morning together with Congressman Case, to conduct this important hearing. At the outset, I would like to qualify one point. There have been a few of our citizens and others in the public press who have alleged that our participation in this type of activity has been for political motive. None other than Capt. Eddie Rickenbacker issued such a statement yesterday. I have the highest respect for him as a

hero, in the auto field, the field of aviation and the experience in the Pacific but if he were here he would not repeat such a statement.

Of course, from my experience, my observations, those who have worked on this matter have done so for the best interests of the citizens they represent. In my own case, the election was held last November. I was elected for 4 years, or reelected, which is twice as long as your respective terms. I point that out because we do so sincerely and we feel that this is a public duty. Very often they still think we took this for a political purpose. But we still continue to do so, regardless of their opinions. My position and that of the mayors with whom I have served is unanimously in favor of the relocation of the Newark Airport. Of course you run into the objection that we are not up to date. We are not facing the facts. Let us meet it head on. Because we represent thousands of people in this city who have signed petitions for that very purpose. This mayor's committee was organized informally and we have done this work without any particular authority because we are officials of this county and this community, including the city of Newark, since last July. We had meetings in July, August, and September, before the first crash on December 16. At the meeting of September 21 last, a resolution was sent to the Governor of New Jersey and United States Senators Smith and Hendrickson in Washington. The two main objects of the resolution were:

1. To ask Governor Driscoll to request and direct the Port of New York Authority to cease spending or committing more moneys for capital improvements at the Newark Airport, such as the new administration building, a $6 million building, except the new taxiway which has just been opened.

2. To the United States Senators in Washington which requested them to initiate a Federal investigation by the United States Senate of the inaction of the CAA and of the Port of New York Authority in connection with the nuisance resulting from the operation of the Newark Airport, to the detriment of the health, welfare, and safety of the people residing in the municipalities and counties affected.

We had a conference with Governor Driscoll at Trenton 2 days ago and he was most sympathetic toward this problem. He was particularly impressed with the loss of 85 lives which occurred within a half-mile radius of the courthouse where this congressional hearing is now being conducted.

On October 19, 1951, the Governor wrote to Charles Handler, corporation counsel of the city of Newark which read in part:

> In my judgment the relocation of Newark Airport would be a drastic step, one that should be considered, if ever, only as a last resort after all other efforts to alleviate this unfortunate noise problem have failed.

There is a safety problem. I might say the mayors of this community, Mayor Kirk, Mayor Biertuempfel and many others have for many years been confronted with this problem. I have not been too active for such a long period. My duties, as you know, consist of legislative activities and its appointments to the Governor. Those are the two main activities in which I am concerned. If somebody can do it better, I am willing to step aside, but so far if I can continue to be of service to the citizens of this community, I will be glad to do so.

The question, Is the airport sacrosanct? Have we made any progress which is paramount in importance? Is it safe not only from death? What do they believe to be the case? The Newark Airport was closed in 1939 and 1940 and the air transportation of this country, no less than 12 years ago was conducted without the service of this airport. Safety, as you stated, Mr. Chairman, is a first consideration. Now the question is suddenly propounded, If it is to be relocated, where should it be constructed? I am not speaking for the committee, but I heard the locations suggested, Dumont and the vicinity of Bergen County, Teterboro, in Bergen County, which incidentally, is almost as near New York as we are here. Morristown, a little farther out, and somebody suggested Hightstown; because we have a New Jersey Turnpike, which is, perhaps the fastest means of vehicular transportation in this part of the country and if an airport should be constructed near the turnpike, at the first isolated area, it would provide rapid transit to the city of New York.

I might say further, and I will be brief from this point on, that on the Port of New York Authority there are five representatives from New Jersey. We have none from the county of Union. We have two from Essex County, there is one from Bergen County whose representatives seeem to be favorably inclined to the Port of New York Authority and perhaps they can work it out better; one from Morristown, and one from Monmouth County, down a few miles farther. The city of Elizabeth or Union County is not represented on the Port of New York Authority. That has been denied. We are to have jets and turbo-jets to come out, reaching down almost to the city limits of Elizabeth, nearer the houses here and the residents certainly know, only one thing will be the result. It will still be more terrifying and more dangerous and, in my opinion, something must be done.

STATEMENT OF G. CLIFFORD THOMAS, NEW JERSEY STATE ASSEMBLEYMAN

Mr. THOMAS. I am very glad to come here today and be a witness before your committee. It was gratifying to me when I heard you say that you are concerned with safety and it is gratifying to me the speed in which your committee responded to the appointment and came to see us in Elizabeth. The mayors' committee and the municipalities in this area have been working on the problem of noise control and the dangerous conditions of the airport and they have been headed by Senator Hand. I am here as one of the four representatives of the Assembly of the State of New Jersey and I can assure you that the temper of the people is for the removal entirely of the airport and, speaking personally, they should be heard, regardless of money. The cost of human element is more important and I ask that your committee take into consideration, the removal of this airport.

STATEMENT OF FRED E. SHEPARD, NEW JERSEY STATE ASSEMBLYMAN

Mr. SHEPARD. I have been interested in this quite a while, because I live in Elizabeth and live about a block away from here; but in our session of the legislature we divided things up and I have let Ken-

neth Hand lead the fight he has been waging against the airport. I have told him he can count on me in the legislature because that is where we can be of help. If I had my way I would plow up the airport and plant it to corn. It is like in the West where I came from, it happens every so often. It happens to be that one of the planes could light on my home or my office or the school children. We will string along with the senator. I am very happy he is leading this fight. Money doesn't mean too much to people in a matter of lives and that airport can be moved if anything can be moved. Anything can be abandoned. We don't mind giving a billion or two to France or Europe to help out the foreign situation but it wouldn't cost a billion to wipe that out and start somewhere else. Those are my personal feelings; thank you.

STATEMENT OF FLORENCE DWYER, NEW JERSEY STATE ASSEMBLYWOMAN

Mrs. DWYER. I, too, am happy to be here today as a woman member of the legislature. While at Trenton I was interested in anything that affects the home or the safety of the same and you must have found out that with our accidents in Elizabeth, the safety of the same is being jeopardized. I introduced a resolution on Monday to stop the expansion of the Newark Airport until all testimony has been heard. I agree with Senator Hand that the airport be put in a location which is not as densely populated as the Newark area is today. As an auxiliary airport or military airport it would serve its purpose. I hope your committee will consider very seriously moving the airport and the expansion to some other location. I would suggest leading from the turnpike at Hightstown. I sincerely hope that the report will be satisfactory to the citizens of our community.

STATEMENT OF FRANK KIMBLE, JR., ACTING DIRECTOR, NEW JERSEY STATE BUREAU OF AERONAUTICS

Mr. KIMBLE. I am here at the request of the Governor as a member of the committee who voted 2 days ago to offer every assistance to your committee in providing what records or technical data and history or background of Newark Airport my bureau of aeronautics can and we wholeheartedly support your investigation.

STATEMENT OF MAJ. GEN. CHESTER A. CHARLES, DEPUTY CHIEF OF STAFF, NEW JERSEY STATE DEFENSE DEPARTMENT

General CHARLES. I represent the Governor as an observer and a member of the committee to assist your committee in any manner possible to expedite your processes of investigation and report. Thank you.

STATEMENT OF COL. FRANCIS V. LOWDEN, MEMBER, ADVISORY COMMITTEE, NEW JERSEY STATE DEPARTMENT OF CONSERVATION

Colonel LOWDEN. I am here as an observer and our end will be handled by Mr. Kimble. We will do anything we can to cooperate in any way at all.

STATEMENT OF EDWARD COHN, PROSECUTOR, UNION COUNTY, N. J.

Mr. COHN. I want to say that my remarks are not to be construed as criticizing the CAA or the CAB. I have stated before and I want to state again that they have offered the best cooperation that anyone can expect, but I still contend and maintain that they do not have the facilities to cope with the situation. Let me point back to 1946 when three hospitals in the city were complaining of the low-flying planes. As a result of those complaints we arranged with the city officials and with the CAA officials for special hearings and promises were made and I recall the situation now and it was over 5 years ago, in 1946. Recommendations were made that airplane traffic to and from Newark Airport should be rerouted to go over the Arthur Kill. Through the cooperation of the board of freeholders, we arranged to set up plane spotters and I had my spotters sitting, at night, on the roofs of the St. Elizabeth, the Elizabeth General, and the Alexian Brothers Hospitals. I also had spotters sitting in Hillside and Union. My spotters reported to me in detail of an instance where a plane flew so low they were able to read the numbers. They gave the time as 9:46, the plane coming from the direction of Newark and it was a two-motored job with the numbers DC 42. The next morning Mr. Reilly, of my office, talked to the airport authorities and reported to them this specific instance of low flying and the noise. I know from authority that the pilots were told they were being watched and after several days or weeks, we did get some relief. However, that spotting was an expensive proposition to keep watch for 24 hours a day and the result was, after getting some relief we discontinued it. It wasn't very long after that, with the spotters not available, that the same situation developed.

My point is this, I say that the CAA does not have, because of lack of manpower and other reasons, the proper administration, the proper watching and policing of a situation like that. Why was it that when we were watching them that we could get relief. What I am going to tell you is a matter of public record. It as exhibited at the hearing on the first airplane crash. We all understand and know that in baseball parlance, three strikes and you are out. In our State, through the motor vehicle department, if you are arrested for speeding twice, you get a notice to appear before the commissioner and once more you are out. If you are arrested for drunken driving the second time, your license is taken away permanently and you go to jail. If you are arrested for the alcoholic beverage control board, for example, for selling to minors, on the first occasion you are fined and you are given a warning, the second is more severe and the third "you are out." I am referring to the records of the Miami Airlines. It is in the record of the first crash. I want you to note these violations:

MIAMI AIRLINES, INC., VIOLATION RECORD

1. February 18, 1947, flight from Kingston, Jamaica, to Miami, Fla., lack of proper flight manifest, improper stowage of cargo and overload of 2,412 pounds. $100 civil penalty.
2. August 16, 1947, Lumberton, N. C., aircraft not properly equipped for instrument flight, logbooks incomplete, baggage and equipment not properly secured. $200 civil penalty.

3. Flight 764, April 14, 1950, Miami, Fla., to San Juan, P. R., overload.
4. Flight 767, April 18, 1950, Miami, Fla., to San Juan, P. R., overload.
5. Flight 770, April 23, 1950, Miami, Fla., to San Juan, P. R., overload.
6. Flight 776, April 27, 1950, Miami, Fla., to Caracas, Venezuela, overload.
7. Flight 780, May 8, 1950, Miami, Fla., to San Juan, P. R., overload.
8. Flight 786, May 17, 1950, Miami, Fla., to San Juan, P. R., overload.
9. Flight 789, May 22, 1950, Miami, Fla., to San Juan, P. R., overload.
10. Flight Ransa, June 6, 1950, Miami, Fla., to Bogota, Columbia, overload.
11. Flight 801, June 8, 1950, Miami, Fla., to Caracas, Venezuela, oveload.
12. Flight 804, June 12, 1950, Miami, Fla., to San Juan, P. R., overload.
13. Flight C-9, June 23, 1950, Miami, Fla., to Barranquilla, Colombia, overload.
14. Flight C-10, June 26, 1950, Miami, Fla., to Cali, Colombia, overload.
15. Flight 818, June 28, 1950, Miami, Fla., to San Juan, P. R., overload.
16. September 10, 1950, Raleigh-Durham Airport, instrument approach procedure and landing below minimums.

Items 3 through 16 compromised for the blanket sum of $1,500.

Where was the CAA, where was the supervision? You can see obviously there are 13 charges within a short period of time of overloading. I can understand there can be some mistakes in one or two instances, where, for example there may be some discrepancy in weight, on the scale, but I say that within such a short period of time, from April 14 to September 10, only a matter of 4 or 5 months, there were certainly enough violations. Nevertheless, it would seem to me that any line, scheduled, or not scheduled, should have the proper supervision in order to avoid a situation as serious as this. There may be some room for argument, but from these continuous violations, it seems to me that the CAA is undermanned or that the proper supervision is not available. While you are dealing with the situation, you will find that in talking about expansion, and we are in infancy, you will have to go along with the progress of airplanes in the same ratio, concerning supervision, manpower, and so forth.

In the first plane crash we had a situation with the right motor. When the plane came to Newark and was loaded, the right motor took 5 gallons more oil than the left motor. I don't want to come to any conclusions, becasue this is a matter beyond my activities. However, why did that right motor take five additional gallons of oil? It is understandable that the left motor may have been a supermotor, who knows that? It may be that in the normal course of events, the right motor taking 5 gallons of additional oil was a normal function. But the CAA, if the proper supervision was there, would have evaluated that situation and found out why there was a differential of 5 gallons, and from their records they should have known the left motor was far superior to the right. But the unfortunate and tragic thing is this, that the right motor, after taking 5 gallons of oil extra, is the one that had the difficulty with the No. 10 cylinder. That was where the difficulty was and I say, with the proper supervision at that time, and from a common-sense point of view, that that differential indicated a warning signal and if, as I said before, if the proper supervision was there, who knows but the 56 lives could have been saved.

I say that we here in the perimeter of the airport are in a danger zone and we are not prepared for this situation and a further expansion of the airport is not within the realm of safety and well-being of the people in this densely populated area. We need stronger enforcement. When you are dealing with human lives, these things are important for the safety of the people in the future.

(The following affidavit was submitted for the record:)

STATE OF NEW JERSEY,
County of Union, ss:

Edward Cohn, of full age, being duly sworn according to law, on his oath deposes and says:

I asked the following questions of Mr. Glass, connected with the Port of New York Authority:

"Q. Under this new proposed runway, wouldn't that be right in line with and expose the following plants and industrial establishments to the hazard of plane crashes on take-offs: Standard Oil Company, full of tanks, Phelps-Dodge Company, Grasselli Chemical Company, Singer Manufacturing Company, Bayway Terminal, Bethlehem Steel Corporation, Staten Island Ferry, and other oil and chemical companies in Linden?"

EDWARD COHN.

Subscribed and sworn to before me this 5th day of March 1952.

WILLIAM MOROZOW.
Notary Public of New Jersey.

STATEMENT OF GEORGE HERLICH, FREEHOLDER, UNION COUNTY, N. J.

Mr. HERLICH. This problem has been very ably presented by the previous speaker and I will confine my remarks to statistics so that we may visualize the seriousness of this entire problem. We can talk here for a week, and it will be very difficult to retain it all, but if we see something through the eye, it is impressive and stays with us longer. Remember these maps after you leave this room, as I think they present the picture very well. We have had our engineering department draw a line showing a 5-mile radius and have shown a number of institutions—hospitals, schools, and other places where many people congregate during the day. In this line is this courthouse, in which today there are possibly 600 or 700 people, including the employees, people in the courts, and others who come here from time to time to do business with the county. This courthouse is directly in line with this landing strip on which the plane was trying to land when the last accident occurred and we know from the evidence taken at this time that the radar people, in giving instructions, frequently referred to the courthouse as 300 or 400 feet from the course, which indicates that the courthouse is directly in that path, and one of the things suggested was that the path be changed and taken away from this congested area, in that the plane fell within two blocks of the hospital, it fell within 200 feet of a school and fortunately the children had left for the day, most of them had but some were still there. Those are the things that we, as members of the board, are concerned with, not only this path in which the courthouse is situated, but the entire picture, because Union County as a whole is affected by this airport. All the planes take off in this direction and land in this direction. This runway No. 6 comes directly up over Hillside and Union, and that was the runway used when the first plane crashed in Elizabeth which went up over here, came down over Union, and landed within a couple of blocks of this courthouse.

Those are the things which we, as freeholders, along with other government bodies are concerned with, because this airport not only since the two crashes, but for years back has been the source of continuous complaints which citizens have made from many communities.

STATEMENT OF JAMES T. KIRK, MAYOR, ELIZABETH, N. J.

Mayor KIRK. My interest in this problem goes back quite a while, for at least 10 years complaints have been coming to me. At first there were complaints of noise and low flying, due to weather conditions. We must expect noise with the heavier type of planes. We put up with the lack of administration during the war and people were willing to do anything for the war effort. They held their complaints until conditions returned to normal. In the old days of smaller planes when flying was not so frequent, the danger was minimized, but today, with the expansion, we are living under an umbrella of danger. These two crashes, unfortunate as they are, have pointed out to all the people, the real danger in which all of us have lived. It is a great fear in the hearts of children and adults who have the responsibility of looking out for children. May I say, in a long experience with this, in furtherance of what Senator Hand said, I do oppose expansion and ask for the removal of the airport. No political motives activated any person, regardless of political affiliation who has taken part in the airport protest. I know relocation would require a lot of money, but what is money compared with human life. That is the opinion of everyone in this community.

If in the next 10 years, progress in airplanes and airfields shall keep pace with its progress in the last 10 years, who is going to pay for the moving of the city of Elizabeth, or Hillside, or other communities, back to the hinterlands. We are charged with not being progressive. I think we are progressive. I have flown 6,000 miles since last November. I like planes. I have been flying for 30 years. If on a round trip to Chicago and back, I can save 30 to 36 hours, then I can spend another hour getting to and from the airport. My observation is that most accidents take place shortly after the take-off and before the landing and so long as that airport is so closely located to a built-up portion of this county and Essex County, then that danger will be ever present. Perhaps some of the authorities will come up one of these days and harness the pull of gravity. Until then, the danger will continue. I say much more money must be spent a few years from now, because of the progress of aviation, Newark Airport will outlive its usefulness. As Assemblyman Shepard said, and I have said many times, that we spent so much money in foreign aid and on those who, a few years ago, were aiming their missiles of death and destruction at our own fighting men, a little charity at home will not be amiss, because we feel that this county at every minute of the night and day is in a position of danger. I think this airport should definitely be removed. Perhaps it would serve a useful purpose if it were maintained in its present position and used only in case of military necessity, available to other airport where weather conditions are blanked out. But for its present use, the airport should be abolished for the interest of the lives of our people. Those are the sentiments of the people of the city of Elizabeth for the past 5 years. That is our position now and every member of the council and every other official stands with me because they have expressed themselves as I have to you.

(The following deposition was submitted for the record:)

DEPOSITION OF JAMES T. KIRK, MAYOR OF THE CITY OF ELIZABETH, N. J.

STATE OF NEW JERSEY,
County of Union, ss.

James T. Kirk, of full age, being duly sworn according to law, on his oath deposes and says:

I am the duly elected Mayor of the City of Elizabeth, Union County, New Jersey, and have held this office for the past thirteen years. I am advised that several spokesmen for the Port of New York Authority, testifying in the matter of the Newark Airport and its connection with the three recent airplane crashes in the City of Elizabeth, New Jersey, have testified that the officials of the City of Elizabeth originally favored the airport and agreed to the leasing of the Airport by the City of Newark to the Port of New York Authority, and to the expansion of the Airport after the execution of this lease.

I personally know that the officials of the City of Elizabeth opposed the leasing by the City of Newark to the Port of New York Authority, that they opposed the Airport expansion program inaugurated by the Port of New York Authority, and that they disapproved of the Airport and complained bitterly about the noise caused by airplanes flying over the City, and also complained of the danger that threatened from the low flying of planes bound to or from the Newark Airport.

I and other officials of the City of Elizabeth, so far back as ten years ago, protested, but about that time the Airport was being used by the military planes, the Nation was at war, and we did not press our complaints too strenuously. When the Airport was returned to commercial use in 1946, a great number of complaints were received by me personally and many more by the office of the Board of Public Works of this City, and these complaints were transmitted to the Department of Aviation of the State of New Jersey (see letter from Robert L. Copsey, Director, July 16, 1946). At this time, the lease between Newark and the Port Authority had not been negotiated. As a result of our complaints, in August 1946 representatives of the Port Authority conferred with officials of the City of Elizabeth, as well as with officials of the County of Union, in an endeavor to quell our fears and to point out what the Port Authority believed to be the advantages to this City of the Airport expansion program.

Early in 1947, when the Port Authority's plan to acquire about 800 acres of land within the city limits of Elizabeth was brought to our attention, I officially notified the City Council of this City, suggesting that a committee be appointed to confer with members of the Board of Public Works and other city officials on this important matter. Such a committee was appointed by the President of City Council and on June 13, 1947, a resolution was passed by the City Council, suggesting that a better site for the Airport would be on the meadowland at the Jersey entrance to the Lincoln Tunnel.

On August 15, 1947, I personally conferred with the Hon. Alfred E. Driscoll, Governor of the State of New Jersey, and Director Robert L. Copsey, Director of Aviation of the State of New Jersey, to protest the low flying of planes over our City and to attempt to abate the nuisance.

In October 1947 a public hearing was held at the Newark City Hall on the question of approval or disapproval of the proposed lease between the City of Newark and the Port Authority. While not a resident of the City of Newark, I appeared at this meeting as the Mayor of the neighboring City of Elizabeth and protested against the making of the said lease. Mr. J. William Farley, member of the City Council of Elizabeth and a member of the councilmanic committee investigating the Airport, also protested, as did hundreds of citizens of the City of Newark, all voicing their opposition to the leasing and to the expansion of the Airport.

In December 1947 I called a meeting at the offices of the Board of Public Works in the City Hall, Elizabeth, to which meeting I invited our State Senator, Hon. Kenneth C. Hand, and the four Assemblymen from this County (Union County), with a view to having legislation enacted that would prevent the Port of New York Authority from proceeding with either the acquisition of the land they proposed to take or any other expansion of the Airport.

Even after the Port Authority had acquired land within the boundaries of Elizabeth for the purpose of enlarging the Airport, the City did not relax its opposition to the proposed expansion. The City refused to close two streets within the acquired area, one of which was necessary for the proper functioning

of an expanded Airport. In so doing, the City placed its reliance on the compact between New York and New Jersey regarding the Port Authority and certain effectuating legislation including the Newark Airport Act of 1947, which forbade the taking of municipal property without the municipality's consent.

However, on March 6, 1950, a Bill appeared in the New Jersey Legislature, Senate No. 252, sponsored by Senator Van Alstyne, which, to use the explanation attached to the Bill, provided that "No injunction shall lie against the Port Authority, its Commissioners, officers, or employees except upon complaint of the Attorney General of either State, each of whom is expressly authorized to bring any proceeding for an injunction, in his discretion, on behalf of any person."

This was the beginning of the end as far as Elizabeth's fight against the Airport expansion was concerned. Briefs filed with the Interstate Cooperation Committee of New Jersey Senate, which was considering the Bill, by the Law Department of Elizabeth, so impressed the Committee that Senate Bill No. 252 was not reported out.

One of the memoranda filed by the City pointed out that, under Senate Bill No. 252, "the City of Elizabeth would have no standing unless it were in a position to influenec the Attorney General to use his discretion to institute proceedings in behalf of the City of Elizabeth. This Bill is strictly a subterfuge and it is intended to circumvent the law as heretofore enacted."

In the Legislature of 1951, this Bill appeared again, now known as Senate No. 183, and this time it soon became evident that the Port Authority had the votes to insure its passage. Informed by our representatives in the Legislature that further opposition would be futile, the City reluctantly capitulated.

The City Officials of Elizabeth were strongly opposed to the Airport from the beginning, contending that it was improperly located, and we still contend it was improperly located and dangerous to the citizens of Elizabeth as well as to the citizens of surrounding communities. We are opposed to the reopening of the Airport for commercial use and it was only when we were completely defeated by the 1951 legislation above referred to that we unwillingly gave up our rights in the two streets, because if we did not give them up they would have the power to take them from us.

Governor Driscoll of New Jersey had always looked with favor upon the Airport. He had complete control of the situation and we knew he had the votes to pass the Bill. In a comparatively recent book entitled "Airports: Design, Construction, and Management," by Glidden, Law & Cowes, published in 1946, page 6, states:

"An aircraft can take off or land in a shorter distance and with less skill required in handling when the take-off or landing is made directly into the wind."

And on page 14:

"The runway, or runways, into the prevailing good weather winds will be used the largest percentage of the time. It is mandatory that these wind directions be covered.

"Whenever possible, the engineer should avoid locating the airport so that prevailing winds require any appreciable percentage of take-offs to be made over congested areas. This is true both because of the noise and because aircraft experiencing engine failure on the take-off have very little choice except to land straight ahead regardless of what is there."

And on page 17:

"It is difficult to overemphasize the importance of selecting the best possible site for an airport. An improperly located airport will prove to be either limited in usefulness, hazardous to some degree, detrimental to established property values, or unduly expensive."

On page 23:

"It is very undesirable to have an airport so located that any appreciable percentage of aircraft take-offs have to be over built-up business or residential areas."

No great harm could come to the airlines, and the metropolitan area would not suffer if the operations of Newark Airport were transferred to a more distant point. Personally, this deponent likes to fly. I believe implicitly in air travel and whenever I find it necessary to travel to some city, even if it is only a couple of hundred miles away, I prefer to use the airlines rather than any other form or travel. But if traveling by air will save me or any other person ten hours, twenty hours, or twenty-five hours, I have no justifiable complaint if out of the great number of hours saved I must use one additional hour in going to the airport and another hour on my return trip coming from the airport. I realize that

time is important. That is why I like to use the airplanes. But it is not so important as human life.

Thousands of people of Elizabeth have seen planes flying dangerously low over our city, and it was predicted dozens of times that some of them would crash sometime. I personally feared that such a thing would happen, but I never went so far as to make any predictions along this line.

Some experts have testified that Newark Airport is one of the safest in the country. Perhaps it was, but three crashes within two months, all within two miles of the Airport and each within a mile of the other, does not speak well for the safety of the planes that were involved in these air tragedies. It may be that the three accidents happening so close together might be termed a coincidence, but experience shows that by far the greatest number of airplane accidents occur on the take-off and in landing. Once the planes have attained their proper altitude, the danger of crashing is at a minimum. But before they have attained a proper and safe cruising altitude on the take-off and in gliding to a lower altitude coming in for a landing, the planes are directly over this City, over the south end of Newark, or over other built-up sections such as Union Township, Roselle and Roselle Park, and the neighboring City of Linden to the south of Elizabeth.

It is the opinion of all the City Officials of this City and of the great majority of our residents that the Airport should not be permitted to reopen for commercial use and that legislation to this end should be enacted by Congress.

JAMES T. KIRK.

Sworn and subscribed to before me this 25th day of March 1952.

[SEAL] KATHRYN MAHON.

My commission expires August 22, 1956.

STATEMENT OF RALPH A. VILLANI, MAYOR, NEWARK, N. J.

Mayor VILLANI. Mr. Chairman, Members of Congress and the committee. I don't want to talk too much. I just want to say briefly that the Newark Airport was started by our city a number of years ago. Commissioner Ellenstein, who was mayor for 8 years, will explain that in more detail, so I will leave that to him. About 4 or 5 years ago, we leased this airport to the Port of New York Authority. Since that time they have taken over. At that time the question uppermost in our minds was how far were they going to expand the airport and what it would mean to the people of the city of Newark as far as noise was concerned and how far they were going with the development of this airport. They assured us at that time and practically guaranteed to us that there would be no noise elements as far as our citizens were concerned and would expand the airport in proportion to our area, and not go any further than that. We took them in good faith; at least I did. I voted for that lease and went along on those promises. It wasn't very long before we received many complaints from the citizens of Newark and our neighboring municipalities that the noises were getting very intolerable. People were nervous and planes were flying low, and appeals were made to the officials to do something about it. I went to the New York Authority and saw Mr. Tobin and complained about our situation, and I pleaded with them to do something about it. They promised me they would. All we got were promises.

It became so intolerable that Elizabeth and Newark got together at the last conference in this very room, never realizing that these catastrophes were so close at hand, and through Senator Hand, we appealed to the New York authorities, and we had Mr. Tobin and officials from the New York Port Authorities begging them to do something about alleviating this situation. They told us they would, but nothing was ever done. I suggested at that time if they would

build the runways in a different direction where planes wouldn't fly in areas of a million people, it would relieve the situation. They said they would do that. They said a little taxi area would help considerably, but they said it wasn't necessary to proceed immediately. Within 1 month's time after this accident, they said the runway would open next week, but the New York Port Authority didn't think it was serious enough until the lives were taken. Now they are building a north and south runway, which will take traffic away from the congested area, go over the Newark Bay and go over to the Hudson River to make the turn. That might help, but we don't know. It is an experimental stage, and I appeal to you gentlemen who have control to see to it that they do not proceed any further than that runway. Let's find out before they pour more millions of dollars in that area.

Now the thing I am worried about, and very few have mentioned it, is the fact that they are going to build a parallel runway which will entail millions of dollars. People are beginning to hear about it. What does that mean. Does that mean that traffic is going to double itself? They are not going to pour millions of dollars in the runway because they want to see another new runway. It means traffic is going to double or triple itself. It means it is going to be much more dangerous for the people of our community and much more hazardous. Now Eddie Rickenbacher says that this is one of the 12 leading airports in the world. Does that mean that we are going to continue to increase like the other 11 so that we can maintain our position? If that is so, that means much more traffic, many more planes, and jet planes are coming along. It is going to be a much more serious situation for our people and the surrounding people. When we had our conference here last July, we did not anticipate these disasters. We had all the pilots of the various airlines here. We pleaded with them to do something with the situation which was prevalent at that time, and they said they couldn't do anything about it, but one pilot, Captain Gill, had the courage to say we could do something about it. We could make a short turn over Weequahic Park, and that would eliminate all the noises around that section, and by that time, we could get enough altitude. They tried that pattern, and it proved a little better, but then they deviated from that, they were tired of the left-hand turn. But pilots disregarded it. They get aroused when things like this happen, they change their course, and when things die down, the public forgets, and they go back to the old pattern and don't give us any help whatsoever. I say this is a serious situation.

We were before the Governor the other day, and I learned that our Governor Driscoll is interested in finding out why these two planes which crashed were supposed to have left from La Guardia and the one that came in here was supposed to land at Idlewild. Why did they pick Newark to land in when the visibility was much less in Newark? The ceiling was much less. Who gave the instructions to the pilot? Who was responsible for that? Why did they change their minds? Why didn't they proceed to Idlewild where the visibility was three times better than that in Newark? If you gentlemen are interested in safety, and if those are the things you are after, try and look at some of the things these people are interested in where the pilots take off and land. You are interested in the safety of our people and you should look into the facts and see that changes are made. What

we want is that the thing is properly handled and give us the relief we are entitled to. We are satisfied with Newark Airport as long as traffic is limited as it was in the past. But I say, gentlemen, the way things look now, as Captain Rickenbacker says, it is one of the 12 leading airports in the world, it has outlived its usefulness, you have got to take it away. Don't listen to us with deaf ears as other people have listened before. We were talking to people last summer, pleading to take the airport away from Newark before we have more serious accidents. We are doing the same to you now. Take that airport away from Newark before we have more serious accidents as we have had in the past. Those people are dead. We can't bring them back any more. Thousands of us now know that the airport has outlived its usefulness. It is getting serious with the new runway, parallel to the north-south runway. It is not going to help. It is going to mean more planes, more things are going to be more disastrous for us. I urge you as mayor of the city of Newark and on behalf of our 1 million people, one-fifth of whom are immediately affected, I beg of you to look into it more carefully and give us the relief of relocating this airport.

STATEMENT OF MEYER C. ELLENSTEIN, CITY COMMISSIONER, NEWARK, N. J.

Commissioner ELLENSTEIN. It would be an aid to your committee if I identified myself. I was the mayor of Newark from 1933 to 1941. From inception to the Second World War the airport was limited to 400 acres, and was set up as such. With the advent of the Second World War it was increased to 800. Then when the port authority took over the airport in the fall of 1948 it was increased 400 more acres in the city of Newark to a total of 1,200 acres and since has been extended to the city of Elizabeth and there is now a total of 2,100 acres. This is a very important factor when you consider the development of larger and heavier planes and the extension of runways.

Mr. WOLVERTON. Was any of the land acquired with Federal grants?

Commissioner ELLENSTEIN. They made some, but I don't know how much.

Mr. WOLVERTON. I am talking about the land itself.

Commissioner ELLENSTEIN. They acquired it with the consent of the governing body. The original lease was made by a 3 to 2 vote of the City Commission of the City of Newark.

Mr. WOLVERTON. Did the city authorities of Newark have any veto power on the taking of the original land?

Commissioner ELLENSTEIN. No; not when it is privately owned.

Mr. WOLVERTON. With reference to the 1,300 additional acres, what percentage came from private lands, such as taking people's houses?

Commissioner ELLENSTEIN. It didn't take any private houses in the city of Newark. It may have taken some industry but they were only small parts. They didn't have the consent of the governing body of the city of Elizabeth.

Mr. WOLVERTON. Twenty-one acres of the land was owned by the city of Elizabeth?

Commissioner ELLENSTEIN. Right.

Mr. WOLVERTON. How many acres were privately owned?

Commissioner ELLENSTEIN. 859 acres and they were acquired through condemnation.

Mr. WOLVERTON. Did the city have a veto power with reference to the 21 acres?

Mr. PFEFFERSTEIN. Oh, yes; they must have the consent of the governing body. Only where the city streets were involved. There were two city streets involved and the pact between the State of New York and the State of New Jersey provided they could not take any municipal property without the consent of the municipality. They passed a law in 1951 taking away the injunctive powers from the municipality and turning it over to the attorney general.

Commissioner ELLENSTEIN. I want to point out to you, that when Congress gave its consent, it is inconceivable to me that it was their intention to create a totalitarian government as the port authority is, in engaging in private enterprise, with truck terminals, bus terminals, crane elevators, golf courses, housing and office buildings, and competing with private enterprise. It is inconceivable to me that Congress consents to such a thing, with no taxes, no local taxes, no Federal taxes, no gasoline taxes.

Mr. WOLVERTON. I understand that you object to the expansion by the Port of New York Authority?

Commissioner ELLENSTEIN. I objected to the expansion of the port authority at the time they were negotiating for the lease. I was not in favor of moving the airport; I was opposed to expansion. From what I learned it was eventually affecting the people of that area who were already seriously complaining.

Mr. WOLVERTON. That answers the question I had in mind. Was there any division of opinion among the Newark authorities as to whether a lease should be entered into by the city of Newark with the port authority?

Commissioner ELLENSTEIN. Yes; there was. The division was 3 to 2. We have a commission form of government.

Mr. WOLVERTON. Would it be impossible under the existing law for the city of Newark to put a provision in its lease that would include the expansion of the airport without the permission of the city authorities.

Commissioner ELLENSTEIN. That is one of the number of things I voted for. I was in favor of the lease providing they didn't expand the airport. I also asked that a covenant be put in the lease that they would not take any of the land and put any industry in that would compete with tax-owned industry.

The Anheuser-Busch brewery had purchased land from the city of Newark. They spent $800,000 in improving the land and before that lease was consummated there was a representation made by the port authority that in the event the brewery was constructed, that they would not interfere with that brewery. However, the lease did not disclose that there was such a covenant. I went to Washington in 1949 when it was brought to my attention and spoke to the officials of Anheuser-Busch and they said they had given up the idea of coming to Newark because they had been fouled or crossed. They couldn't get the allocations under the War Manpower Act. They gave up the idea and gave me 60 days to get a covenant in the lease that would assure them that there would be no interference with the building of

the brewery. I saw Governor Driscoll and it was only after some difficulty that he insisted that they have such a covenant in the lease and the result was that the covenant was put in the lease and they satisfied Anheuser-Busch and they have now constructed a building, with more units to come and are operating in the city of Newark. If the port authority had its way, the Anheuser-Busch brewery would not have been in the city of Newark.

Mr. WOLVERTON. Do the authorities of the city of Newark object to the latest expansion by hearing or otherwise?

Commissioner ELLENSTEIN. I was about to say, there is a misconceived notion created.

Protests of the noise of the low-flying planes came all the way back from the time the port authority was negotiating for the lease. While representations were made by the port authority, planes were to land one a minute at the airport. Of course, that was a serious situation. Planes were flying low, children were awakening in the night, walls were creaking, there were vibrations because of that and I say to you gentlemen, the planes came in by the hundreds.

In 1949 a resolution was passed by the city commission asking the Governor to stop work on the airport until it is determined whether the airport is dislocated and outmoded. Again in the summer of 1950 the city commission passed a resolution calling upon the Governor to stop any further outlay of moneys until it is determined whether the airport is dislocated and outmoded and it would be a waste of taxpayers' money. That fell on deaf ears. In 1951 the committee of seven municipalities passed a resolution in which they called for a senatorial investigation where the people would be subpenaed by due process so we could learn the truth.

During that entire period and for the past 9 years I have lived within three-quarters of a mile of the airport on the fifth floor of an apartment house and I am here to give you living and eyewitness testimony that I have seen planes level with my eyes, as I looked out at them. The section where those planes pass so low is the only residential section left in the city of Newark. It is a densely populated area. It is the second most congested city in the United States in the point of city miles, and there are 20,000 people to the square mile in the city of Newark, this notwithstanding the fact that one-eighth of it is meadow land. In 2½ miles you are beyond the city limits.

Colonel Rickenbacker has now, or his company has, ordered 75 new planes. All larger models and the statement in all of the newspapers that I look at says that they are so constructed that they will be able to convert to jet propulsion without much difficulty. Have any of you gentlemen heard jet planes take off? I am sure they would not kill people in this area by degrees: they would kill them outright. I am here to tell you there is a misconception of the whole thing. These planes weigh on the average 120,000 pounds gross. They come in to the airport for landing at a speed of more than 100 miles per hour.

Seven organizations in this vicinity have agreed that this airport is dislocated. It is certainly a hazard to the people of the city of Newark, the largest city in the State, a city of 480,000 souls. We again ask that you suspend the operation of expending millions of dollars until it is determined that the airport is outmoded and dislocated.

We have a man named Captain Behncke who has been in aviation since 1915, been in aviation since the first war, who organized the Air Pilots Association in this country and also organized the International Air Pilots' Association in which there are 17 countries throughout the world, except the countries behind the iron curtain. He says the airport is too closely situated to the city of Newark, no matter how many runways they put in.

One plane crashed into the river and one was trying to make a turn. I have learned that from the mouths of those people who have said "You are absolutely right, the airport is too close to the city of Newark and should be moved out, but don't quote me, because if you do I will deny it because I am afraid of reprisal."

Mr. WOLVERTON. The question is, whether the port authority gave you an opportunity to be heard.

Commissioner ELLENSTEIN. Yes; we had Mr. Tobin here on July 25, 3 months before the first tragedy, and a resolution was passed by this group that we call upon the Governor to stop expenditures and stating that this airport was dislocated and investigation should be made to ascertain whether it is a danger to the community and whether it ought not to be moved. They always had a representative at the three meetings we had, "Isn't that right, Senator Hand?"

Mr. WOLVERTON. Did the port authority ever sit together as a committee to listen to what you had to say or any of the others from surrounding communities?

Commissioner ELLENSTEIN. They sent a representative. The port authority doesn't operate that way. I have sent any number of letters to all of the members of the port authority. We have two that come from this area.

Mr. WOLVERTON. It would seem to me, that having the authority they do in the area over which you have some jurisdiction, that an opportunity be given, if a request were made for a hearing, at which you could object to the further expansion of the airport and I am trying to find out whether application had been made for a hearing?

Commissioner ELLENSTEIN. They did send a representative here at the three meetings we had. Mr. Tobin was the guiding light and a Mr. Class who was the divisional director of the port authority.

Mr. WOLVERTON. I am very anxious to find out what opportunity, if any, has been afforded you to be heard by the port authority itself, composed of five members from New Jersey and five from New York and if your organization had an opportunity to present your objection to the board in person?

Commissioner ELLENSTEIN. Mr. Congressman, this organization is of recent origin. It was called together by Senator Hand. The first meeting was in July, the second in September, and the third meeting after the first tragedy.

Mr. BECKWORTH. How many members are there of the New York Authority?

Commissioner ELLENSTEIN. Five from each State appointed by the Governor.

Now, we are a city that has, as I said, about 480,000 population, slightly more than 10 percent of the total population of the State.

Mr. CARLYLE. Now let me ask you this: What is being done now to improve this situation?

Commissioner ELLENSTEIN. There is a runway being put in now to extend, which total length will be 10,000 feet, and that is in the process of construction.

Mr. CARLYLE. Now, some of those funds will come, of course, from the Federal Government?

Commissioner ELLENSTEIN. Correct.

Mr. CARLYLE. The total for the administration building will be?

Commissioner ELLENSTEIN. Administration building at $6,000,000.

Mr. CARLYLE. Is that under construction now?

Commissioner ELLENSTEIN. No, that is not under construction.

Mr. CARLYLE. When is construction to take place?

Commissioner ELLENSTEIN. That would be a military secret with the port authority, a separate monarchy of its own.

Mr. CARLYLE. It is definitely, though, on the agenda?

Commissioner ELLENSTEIN. It is on the agenda, and I think—I am not certain about it, Congressman—I think grants will be available. I have a port coordinator who is in my department who keeps me informed, and the last time I spoke to him on this subject he said that the foundations were not started, but now he tells me the foundations are being built.

Mr. CARLYLE. For the administration building?

Commissioner ELLENSTEIN. Yes.

Mr. CARLYLE. How much does that cost?

Commissioner ELLENSTEIN. $6,000,000.

Mr. CARLYLE. Approximately one-half of that amount comes from the Federal Government?

Commissioner ELLENSTEIN. Less than that, probably 20 percent.

Mr. CARLYLE. With the exception of the runway and administration building, do you know of any other improvements that are being made?

Commissioner ELLENSTEIN. They are constantly making improvements there. They are putting in some auxiliary runways, running northeast and southwest, which they say will relieve those annoyances.

Mr. CARLYLE. Has any effort been made that you know of to cause these improvements that you have just related to be delayed until the proper appraisal can be had?

Commissioner ELLENSTEIN. Oh, yes, Mr. Congressman. I said in 1950.

Mr. CARLYLE. I am speaking now of any recent effort. Has there been any recent effort made?

Commissioner ELLENSTEIN. Reasonable?

Mr. CARLYLE. Any recent effort?

Commissioner ELLENSTEIN. Oh, yes, on the premise that this airport is dislocated. That is the reason. Otherwise, it would be a wanton expenditure of $10 million of taxpayers' money.

Mr. CARLYLE. The point I am trying to bring out is this: Have you contacted any agency in Washington with a request that this Federal money might be expended at this time for these improvements?

Commissioner ELLENSTEIN. No, we haven't, but we have been with the Governor. We were with the Governor only 2 days ago. There was a resolution sent to our United States Senators calling upon them to look into it, and copies of the resolutions of 1950 and 1951 were also sent to the United States Senators of New Jersey and to the Congressmen in our district.

Mr. CARLYLE. And you are saying to us now that the citizens of this area are opposed to the Federal Government spending this additional money to improve or enlarge this airport?

Commissioner ELLENSTEIN. Well, I might qualify it by saying that they are opposed to these annoyances. They are opposed to these hazards.

Mr. CARLYLE. I understand that, but are you now taking the position that the citizens of this area are opposed to the Federal Government spending this additional money to enlarge this airport?

Commissioner ELLENSTEIN. Yes, sir, and what is more we are opposed to this: We acquired the Army base from the Federal Government in 1936, and we obtained it for $2 million, and there was a condition in that sale whereby in the event of emergency the city would receive 3 percent of the amount that we had actually expended. There was a sale where the city paid $100,000 a year without any interest on the balance until the $2 million were paid. However, for some reason unknown to us, inconceivable and illogical, although the city would only be entitled to thirty or thirty-six thousand dollars, the port authority was able to obtain $520,000 a year instead of $36,000. You might bear that in mind, gentlemen.

Mr. CARLYLE. One more question and I am through. Are you confident that the opinion that you have expressed to this committee relative to it being the wishes of the people who reside in this area that the Federal Government not spend additional money to enlarge this airport is the sentiment that is felt by the people in this area? You are confident of that, are you?

Commissioner ELLENSTEIN. Yes, sir.

Mr. CARLYLE. That is all I have.

Commissioner ELLENSTEIN. Now, I want to say this to you: Do you know that there are many more people whose lives are shortened because of not receiving what might be termed "prophylactic treatment"? We have many, many volumes of people. You could fill this place 10 times over again at a mere call of people who have suffered for years, complaining about these noises years before these tragedies happened. They simply helped to arouse and put these people in deathly fear that it might go into their homes. We have letters from people in hospitals where patients are affected. We have one of the largest hospitals in the State, setting up approximately 250 feet above sea level, located in this area. I live in an apartment house three-quarters of a mile from the scene. Visit the veterans in the temporary homes in the housing project in Weequahic Park, and ask them how they are disturbed, how they feel, how their children are awakened in the night. There is no question that any person, particularly so a child, let alone an adult, would have his nerves shattered if they were awakened in the dead of the night from time to time by these annoyances. That phase is demonstrated by the fact that this objection didn't just come about through these tragedies happening. Seven communities got together long before these tragedies happened, and that is made apparent by the fact that we had two meetings in July and September. They were instituted and organized in July of last year.

Now, it is incumbent upon you gentlemen to consider the fact that there are involved here not only human rights but property rights. Human rights are inherent, but property rights are rights which are

given under the Bill of Rights, which is deeply embedded in the Federal Constitution, and they are inalienable rights, if you are going to consider the Constitution, and that is incumbent, in my opinion, on every official of National, State, and local level. Common decency dictates to us, of course, the desire to prevent accidents in the future. These investigations that may prevent other accidents, they are fine. Unquestionably they are of great value. Even if we save the life of one individual they are of great value. However, the point is that the health of the people in our community, running into hundreds of thousands, is directly affected by reason of the fact that these planes come up and cannot gain any more altitude, or cannot come in above the clouds. Every time there is a low ceiling I can see planes on the level of my eye. Obviously, within three-quarters of a mile of the airport, they are not going to fly above the clouds and come in on a perpendicular. They fly on an eyepath, which is on the level of a fifth-story window. That reminds me: About 6 or 8 months ago our highest court in the land, the Supreme Court, restrained a commercial broadcast on a jitney bus—that was just 6 or 8 months ago—because it interfered with the property rights of the individuals that use the bus on a quasi public conveyance. I think you gentlemen recall that.

Now, how does that compare with the situation here? These are human rights, and the question arises, "Are we going to put dollars above the priceless value of lives, or affect the health and welfare of children and of adults, too, and of those that live and work in this area?" You can go into the St. Elizabeth's Hospital right here in Elizabeth and ask the men that operate in the operating room in one of the upper floors. Three of them have told me that when a plane comes over while they are operating, instinctively they duck their heads. Now, those things may sound fantastic to you, but they are realities, as any of these men in all the communities can testify. I hope that you will give this all the consideration it deserves, and realize that the people of this community, of the city in which I reside and which I represent, and in communities in the surrounding area, are looking to you, because we haven't gotten anywhere on the State level. Thank you.

Mr. WOLVERTON. I would like to say to the chairman that the Port Authority of New York evidently has not given that personal opportunity of hearing from the citizens of affected localities. We are all familiar with the fact that at the national level and State level and county level and local level that those who are elected by the people do give an opportunity to interested citizens to present their viewpoints on any matter of sufficient importance that claims their attention. The Port of New York Authority is not an elected commission.

Whether that has a tendency, as it does in some instances, to cause the authority to give that lack of attention to the public interest from the standpoint of giving it an opportunity to be heard, I don't know. I don't want to preclude or prejudge, I should say, the authority, but it would seem to me that in a matter that affects the lives as well as the property of the individuals in a community that comes within the jurisdiction of their operations, that they should have the same desire to give individual citizens and those speaking for them in representative positions the opportunity to present the viewpoints of those citizens, and that was the reason, Mayor Ellenstein, that I was

so anxious to know whether that American right to be heard had been denied in this case, whether it had been requested and refused, or only complied with to the extent of sending some representative from the commission to hear what objections were to be made. My own way of thinking is that it is sufficiently important and that the port of authority as a board should give the opportunity for interested citizens to be heard in a matter of this importance.

Mayor VILLANI. Are you going to invite the whole Port of New York Authority Commission to appear before you here at this hearing?

Mr. WOLVERTON. That is up to them.

Mayor VILLANI. I think it is important enough for them to invite the whole Authority.

Mr. WOLVERTON. You may rest assured, Mayor, that so far as this committee is concerned there will be no factor that enters into this decision that this committee will not make inquiry of.

Mayor VILLANI. Do that. Maybe you will get further than we did.

Mr. WOLVERTON. I hope you are not seeking to discourage us in our desire.

Mayor VILLANI. No, sir.

Mr. WOLVERTON. I am trying to indicate that I think that opportunity should be given to yourself and the others who have had such serious objections to the expansion of the Newark Airport.

Mayor VILLANI. We tried hard, but we couldn't get it.

Commissioner ELLENSTEIN. Mr. Congressman, may I have the privilege of sending one of the statements made by Captain Bentley back in 1949, and written voluntarily and declared and read? He has sent me a memorandum as to just what the situation is. I think it will throw a great deal of light upon the subject, as I said. It is not a self-serving declaration.

Mr. WOLVERTON. He is a member of this committee. He has appeared before us, and we always value the thoughts and views that he expresses, and it may be in this instance after you have been kind enough to send us the statements that he made that we may want to examine him personally. That will be determined by any statement that you send us.

Commissioner ELLENSTEIN. May I ask that the memorandum that I send you that he has conveyed to me be made part of the record?

Mr. WOLVERTON. You may make that request. I approve of your having the opportunity to make that request.

Mr. BECKWORTH. You heard the motion. Without objection. It is so ordered.

Commissioner ELLENSTEIN. May I ascertain where I should send the memorandum?

Mr. BECKWORTH. Address the memorandum to our clerk. He will give you his address.

Before you sit down, I want to ask this question:

In view of the fact that the administration building has hardly begun—or, if it has begun, only slightly—do you and the people who are interested in this expansion propose to state further your views to the Civil Aeronautics Authority of our Government?

Commissioner ELLENSTEIN. Well, yes. I think our committee would do that. I would like to speak to the committee, but I think that has

been our position. Wasn't the Civil Aeronautics Authority represented at the Governor's conference? Do you remember?

Mayor VILLANI. No. The port authority was there.

Mr. BECKWORTH. It occurs to me, where your interests are as sincere as they are, that it would certainly behoove you to obtain a hearing and present in the fullest way possible your case to any group or to any segment of any phase of government that is putting up money, if it is something that you do not wish; and, in further comment to the efforts of the committee to get full information about this, I want to say, as chairman of this subcommittee, that we propose to get all the information we can from every source and as rapidly as possible with reference to these incidents and with reference to this problem and other problems that might be of a similar nature.

This committee does have a background of sincerity for entering all of its tasks with sincerity and with the proper type of purpose. I feel I can assure you citizens that.

Commissioner ELLENSTEIN. Well, very frankly, I think there are any number of people. I might say this: I had a lady that talked to me that have moved to the suburbs; that is, west of the city of Newark. Our city is surrounded by municipalities that are separated from us only by an imaginary line which runs through homes. She told me she had called the Civil Aeronautics Authority about 2 years ago complaining of the noise and how her children were awakened during the night, and somebody in charge of the regional director's office told her, "Why don't you move?" So she did. And there are, conservatively, hundreds upon hundreds of families that have moved from the south end of the city of Newark—I will vouch for that, because I have lived in that area for 9 years—hundreds upon hundreds, and many more, depreciating property values. There aren't any persons who want to bring up their children under conditions like that. If there is any doubt about it, your committee is welcome to spend a week end when these airlines are not aware of your presence, because they do have a habit since this last tragedy—I note that there are more airplanes going over our section, even though it is a slight deviation. And, when there was a clamor by an organization in the south end of the city, petitions were circulated; then more of the planes were diverted over Elizabeth, thus playing will-o'-the-wisp with municipalities and people's lives.

Senator HAND. We now have Mayor Kirkpatrick of Hillside.

STATEMENT OF ROBERT C. KIRKPATRICK, MAYOR, HILLSIDE, N. J.

Mayor KIRKPATRICK. Mr. Chairman, members of the committee, ladies and gentlemen, I don't have too much information to give to you gentlemen, but I have my plea to you people in behalf of 21,000 people residing in the township of Hillside requesting you, wherever within your power, to assist us in getting rid of the growing cancer known as the Newark Airport. I feel that you have shown by your promptness in coming here after being appointed that you feel some responsibility for the happiness of the citizens who support you and elect you. Your questions have convinced me you are going to make a thorough investigation. I would like to say that my citizens, the people who live in Hillside, are the ones that want the Newark Airport removed, and not the politicians in the town. When you live in

a small community such as I do, 2 square miles and 21,000 people, almost butting into the airport, I am sure you would realize that we know the semblance of our people and we wouldn't dare come before you and ask you to do these things unless we did know the semblance of the residence of Hillside. For more than 2 years I have been complaining about low flying. They even skim over the top of our little municipal building. We have to cease our conferences until they get by. Many of our people labor that are living in Hillside. They are disturbed in their days of labor. They are disturbed at night. Their rest is broken up by the constant low flying over Hillside.

Of course, all of our citizens throughout America have been living under the feeling of apprehension, as all of us are well aware. I think it is bad enough that all of us have that sense of apprehension as to what is going to happen in the world, whether there is going to be an all-out war or not. However, take into consideration that, on top of that, every time our citizens hear a plane coming over their house today, especially after the last two tragedies, I can assure you that this is not a grandstand play on our part seeking this. I hope that each and every one of you while you are in this area will come to Hillside and meet some of our people and hear the planes and judge for yourself whether their protests to their township officials are based on sound reasons or hysteria, or whether they are justified in their complaints. I predicted in this very room at a mayors' meeting shortly after the first tragedy that there would be another one. I said I believed Hillside would be the one. Thank God, I was wrong on that. Unfortunately, Elizabeth has suffered twice, and I am convinced unless we do something about the moving of the airport you have not seen the last of such tragedies that we are discussing today.

The map in back of you, I think, gives you a pretty good idea of the congested area in this vicinity. We are spending millions of dollars to bring a sense of security to the minds of European people asking to fight communism. I don't know of any weapon that would make Stalin chuckle more than this Newark Airport is doing, because they love to have citizens who are opposed to their way of life live in a sense of fear. A citizen in this part of the country is living in a sense of fear and apprehension as to when the next airplane will fall.

I want to offer the services of Hillside and the township committee to you gentlemen. Anything we can do to assist you gentlemen, please feel free to call upon us. Thank you very much.

Senator HAND. Before I call the next speaker, Mr. Chairman, I would like to ask if the gentleman intends to offer the very prominent map into the record.

Mr. HERLICH. We would be very happy. It shows not only Union County but the numbers referring to the number of people who would be in various buildings, such as hospitals and other places of interest.

Mr. BECKWORTH. Our committee will be pleased to receive that.

Senator HAND. Our assemblywoman has pointed out in a memorandum that the head of the Port of New York Authority, Mr. Coleman, has recently released figures as to how much assistance was being contemplated in connection with the Newark Airport. That material is available. Perhaps you could secure that.

Is the mayor of Linden here? Mayor William J. Hurst.

STATEMENT OF WILLIAM J. HURST, MAYOR, LINDEN, N. J.

Mayor HURST. While I am here to represent Linden—the city of Linden is less than a mile south of the last tragic scene—I feel that I am here with the rest of these officials as one of the representatives of the community here, not described by any geographical lines or city lines. We are here in a union of people, and we object to the way air traffic is conducted from here, and we have in the past. Linden is in the path of the planes coming into the runway that we understand now is the most used.

Senator HAND. I might just point out that yellow area on the right.

Mayor HURST. That's right, and our community and the surrounding communities are composed of people who are in fear of the safety of their families and they are conscious of the fears and of the dangers of their neighbors, whether they are far or near. They likewise are concerned with the thousands of people who make up the passengers and the crews of the aircraft that pass over. Now, the fears of the people in this vicinity date back a long way, and the recent tragedy here makes them feel that they are fears that are well founded. We want everything done that can possibly be done to eliminate the dangers that exist here. This city of Elizabeth and the surrounding territory was founded back beyond the Revolution. These people have lived in peace and industry and contributed to the support of democracy all these years, and these days it is recognized that this vicinity is a potential bombing point for enemies from abroad. Now, if that comes, we can't do much about it; but please do something about not allowing destruction to come and death to come from the skies from our own planes. Thank you.

Mr. BECKWORTH. Mr. Hinshaw, at some place in the proceedings, it would be appropriate to have the proper officials enter into our record the number of fatal air accidents that have taken place over the past 24 years since 1927 in the Newark Airport area. I don't know what official that would be, but I would assume that the mayor of one of the cities or the airport commission or someone would know whether or not there had been other serious accidents in this vicinity.

Senator Hand, can you get that information for us? And do you think you can obtain that information for us?

Senator HAND. I suppose I could get it. I don't have it at the moment, sir.

Mr. BECKWORTH. Well, I assumed you wouldn't have it right now, but we will ask you to see what you can do to get us that information.

Senator HAND. Is the mayor of Roselle Park here, or someone representing him? Councilman Teller.

STATEMENT OF CHARLES TELLER, COUNCILMAN, ROSELLE PARK, N. J.

Councilman TELLER. I represent the mayor of Roselle Park and the people living in that township. We have a little community there, and it is almost an effort to go downtown any more to borough hall without at least a half a dozen women wanting to know what we are going to do about the low flying.

Mr. BECKWORTH. Speak a little louder, please.

Councilman TELLER. I would say that these airplanes fly so low that at times the suction of the plane draws the top of the trees right over, and these women, the majority of them, are scared to death, for which I don't blame them. I have a neighbor who moved here from Brooklyn. They complained to me yesterday. She says she goes to sleep with cotton in her ears. Now, I would like to ask you, Mr. Chairman, if you would like to have your wife going to sleep with cotton in her ears with that type of fear of the noises. Something should be done about this condition that exists. As I said, they threatened the other day if I didn't have the solution that some action should be taken. I don't think anyone else here has a solution. It is a serious matter.

I said at the last meeting here that about a year and a half ago I was to one of these meetings and I protested against the low flying. I said it is only to be a matter of time when one of these "babies" is going to sit right down in your thickly inhabited community—school, hospital, church, office building, home, or what have you—and at the last meeting that we had here I said, "For once I was right. We got it. But, thank God, it wasn't in Roselle Park." But, nevertheless, it took the lives of a great many people who were the innocent victims, and I wish that something would come out of this and we could really do something about it, and correct this situation. These people have made an investment. They have bought their homes and moved out in these communities. They want to be happy, and they are not happy under these conditions. I will tell you they are not; so I leave it in your hands, sir. Thank you, sir.

Senator HAND. Is there a representative from Cranford? Is there a representative from Rahway?

Councilman Printz.

STATEMENT OF WILLIAM PRINTZ, COUNCILMAN, RAHWAY, N. J.

Councilman PRINTZ. Rahway is about 5 miles from Elizabeth. I can give you the facts and figures. I happen to live on the border line, and I took notice. As I look up in the air in the evening, it just looks like an automobile up in the air. The landing lights are on, and Rahway is 5 miles. They start setting a pattern, I understand, here, where you must, but they start their pattern. Now, their wheels are going down. I can sympathize with Commissioner Ellenstein when he says "the airplane is three stories low." You can imagine when they are 5 miles away and very low what will happen when they get closer. The whole council was going to be here today, but they couldn't make it. I want to thank you gentlemen for hearing us.

Senator HAND. Is Roselle represented? Well, I would like to call now upon Mr. A. O. Murray of the Chamber of Commerce of Eastern Union County.

STATEMENT OF ADRIAN O. MURRAY, EXECUTIVE VICE PRESIDENT, CHAMBER OF COMMERCE OF EASTERN UNION COUNTY, N. J.

Mr. MURRAY. Mr. Chairman, members of the committee, Senator Hand, and ladies and gentlemen, the Chamber of Commerce of Eastern Union County is and has been vitally interested in this problem. We have continuously been requesting the authorities to cor-

rect some of the problems that the citizens have had to put up with. May I ask your permission at this time to present a member of the committee that was especially appointed by the chamber of commerce to look into and report on this problem, Mr. Philip Osterman, who is an industrialist of this city, who is a resident of this city, and vitally interested and has made an investigation of this.

STATEMENT OF PHILIP C. OSTERMAN, REPRESENTING CHAMBER OF COMMERCE OF EASTERN UNION COUNTY, N. J.

Mr. OSTERMAN. Mr. Chairman, members of the committee, and citizens of our community, for the sake of brevity, so much time is going by, I will not read any preamble here about resolutions the chamber of commerce has presented, and I will try to take that paragraph which goes into the meat of the resolutions. I will read the resolution.

> The Chamber of Commerce of Eastern Union County demands the removal of Newark Airport as a major commercial field, and we recommend that immediate legislative steps for its removal be made. In the meantime, we also demand that the action be taken to eliminate the hazards caused by the existing facilities of the Newark Airport.

I think the question was asked, "Were any of our objections presented to authority?" And this is a copy of this resolution, and a copy was sent to our Federal and State legislative representatives of Union County, N. J., as well as a copy to the Governor of our State of New Jersey, Hon. Alfred E. Driscoll, the New York Port Authority, and the Civil Aeronautics Administration in Washington.

I think, too, the question I have heard several times asked was "Did the port authority give the citizens or their representatives an opportunity to be heard?" Now, I don't know whether such a request was made since these disasters which have caused this flurry, but prior to that, at any meeting that I have attended—we have attended several—there were no members of the port authority, but there were subordinates, flight commanders, and what have you, and they, of course, told us all about the nice things they will have, such as a flight pattern, and they will be flying high, and of course, all such things. However, at that time it was more a question of noise and airport expansion, and when some of us walked to a similar map and pointed out that such and such a pattern leads directly over the most congested part of our city and where our tall buildings are, and suggested that the least we expect is that this particular pattern be eliminated, they rather acted as though we were asking an imbecilic sort of a request. I think, along with others that have already spoken, that this airport may at one time or at its inception some twenty-odd years ago may have been well-placed, but they certainly did not contemplate airplanes which we have today which carry 50 people and weigh many, many tons. Those little planes, those smaller planes could enter and get out of an airport at a much steeper angle, but these planes just can't do it, and so therefore it is a mistake.

In ordinary life, if we follow a pattern of, or rather, a path of error, about the first thing we do is stop immediately and try to correct it and that ought to hold true in the case of this airport's activities. That is a path of error, and it certainly should be stopped and should

not be gone through sort of bullheaded, head-on, trying to insist on carrying through. You don't do that ordinarily in an error.

Now, the march of progress, they talked of the march of progress. Again the march of progress should be in the right direction and not a direction which causes a hazard and possible destruction of life and property.

I have some other thoughts here which probably are repetitious, but I believe the situation is so serious that I think perhaps we can stand some repetition.

Some thoughts of the chamber were that the Chamber of Commerce of the Eastern Union County is vitally interested in the recent airplane catastrophe that happened on December 16, 1951, and January 22, 1952, in which the lives of nearly 100 people were lost. We are not unmindful of the convenience of Newark Airport to the New York metropolitan area, but we are sorely grieved, not only because of the loss of life in the airplanes, but the lives of Elizabeth citizens which are snuffed out when innocently occupying their own homes. This double tragedy more than emphasizes the necessity for immediate action to safeguard the lives of the citizens of Elizabeth and the surrounding area.

For 3 years or more the chamber of commerce of Eastern Union County has been advising the Governor of our State, the Honorable Alfred E. Driscoll, the New York Port Authority, and the Civil Aeronautics Administration, as well as our State and Federal legislative representatives, not only of the nuisance and noise caused by low-flying planes to and from Newark Airport, but of the constant danger of a catastrophe such as we have recently experienced. The time has come when drastic action must be taken. The abandonment of Newark Airport will help to correct this situation, and we sincerely request that this committee will bind or exercise whatever rights are necessary to protect the lives and properties of this area.

Senator HAND. Mr. Alton Van Horn, board of realtors.

STATEMENT OF ALTON VAN HORN, REPRESENTING EASTERN UNION COUNTY BOARD OF REALTORS

Mr. VAN HORN. Mr. Chairman, members of the committee and ladies and gentlemen, I presume I was asked to come here today because we have something to do with a petition that is in circulation. In a matter of this sort we of the Real Estate Board of Eastern Union County Board of Realtors, feeling that the people wanted a simple and effective way to be heard, set about making available a vehicle of expression to which the voice of the people might be heard. I might say to you gentlemen from present indications it can be heard loudly and clearly.

Due to the recent tragedies, we now have an emergency session to deal with this menace that has long been on our minds, this business of being wrenched from your sleep in the dead of night, your children running to your bedside in the dead of night, is not new to us. This didn't come just with the two crashes. We had that before. I happen to live in Union Township, where the planes come over—I wouldn't estimate the height—but they make every fiber of the average dwelling, and the very foundation vibrate, which is terrifying, and

we don't think we should be subjected to that. We think it ought to be placed in the hands of our United States legislative representatives from this area as well as to our State representatives. I think the demands of these people should be enought to cause something to be done about this menace. I might add that there are a great number of people, people from all walks of life, who took the same position and endorsed this petition, individuals as well as representatives of the groups, touching on all segments of community life. They approached us from all segments of community life, as I stated. They approached us if they might participate to collect in documented form this feeling of the people of the Eastern Union County. The petition reads as follows:

> We, the undersigned residents of Eastern Union County, having experienced two airplanes crashes which cost 84 lives in our area in 5 weeks and living in constant and ever-increasing fear for our lives and the lives of our children, hereby demand that the use of the Newark Airport be discontinued immediately.

The petition was signed and was given to our legislators who worked strenuously in our behalf for a long time.

Of course, the people are generally indignant and generally afraid. They feel that they are overdue for relief from this annoyance, and this danger from these low-flying planes brought about by the presence of them. They feel that the recent terrifying crashes have only served to make altogether too real not only a menace to their health, a danger to their lives to the lives of their children and to the lives of the children unborn who certainly will inherit a more vicious situation than we if this thing is allowed to remain.

I know so far we have directed our comments to the past history, but I sincerely hope you gentlemen will direct your attention to the likewise probable future course of this thing. These people have had their atention called to the number of flights previously not generally known. There are horrifying discoveries as to the number of life-taking crashes, and these crashes not only can but do and probably will happen here. Also, for certain, there will be more, much larger, and more lethal planes carrying more weight and more fuel over their heads and homes. Also, Newark Airport will shortly receive much and all of LaGuardia's load, probably more than three times the traffic it now has. It is shocking to find out that we are and will remain in the blind landing path for Newark Airport. In the language of laymen, that is the area in which these monsters grope, figuratively and almost literally blindfolded, over our heads for a place to land. The question occurs, "Is it convenient to the airline traveling public?" Is the convenience of the airline traveling public so important that we must be asked to endure this menace so that they can save a few minutes getting to and from the city?

In his connection, this morning's New York Times quotes a representative of the airplane pilots association having said that when the chips are down in bad weather they head for Newark Airport as the best answer to a tough problem. They said it was the best bad-weather field in the New York area. Apparently they were using the bad-weather field in the New York area when they had this last tragedy up on the hill. There couldn't be a much more straight forward statement as to what we are headed for than that statement which was carried by the New York Times this morning.

Coldly and theoretically, it seems to an untechnical mind, long past time to move this airport, lock, stock, and barrel where it belongs; out, out where this power parade doesn't have to perform over the homes of some million people. This it-can't-be-done attitude that it is a physical impossibility to do the things that we ask, along that line, I would just like to point out to you that the newest releases tell us that for operating reasons, LaGuardia is to be put on the shelf. If this be true, it doesn't seem to be unreasonable for human safety that the ill-renowned Newark Airport be likewise treated. The people here don't think that that is too much to ask.

In conclusion, may I appeal to you as citizens, human beings, our Representatives, and fathers, if I may talk for other men in the same boat, and I make a simple plea to you, a plea that you search full, search for fact first. You will want to do that. We don't need to search, because they hang over our heads all the time. Then, if you search for facts, would you be so good as to search your minds and your hearts and see if you can find just one iota of moral justification for the continuance of a situation where so many people have to be so continuously exposed to so much danger so thoroughly against their will? When you complete that search, we sort of have the feeling that you won't find any justification for this, and if you fail to find that justification, the people would generally appreciate it if you would do your best to get this menace out of our midst and off our minds. Thank you very much.

Senator HAND. I would now like to present the president of the Elizabeth City Council, Mr. Boyle, who has conducted an indignation meeting.

STATEMENT OF JOHN C. BOYLE, PRESIDENT, ELIZABETH (N. J.) CITY COUNCIL

Mr. BOYLE. Mr. Chairman, and members of the council, it just occurred to me that since I have been here and since you gentlemen have been here that I have only heard one airplane pass this morning. It is a good thing that you fellows came out here. You should come out here more often. I think that one plane that we have heard has been pretty high too.

We had an indignation meeting last week before our council of about 500 people, most of them from our county, and I suppose there were just as many on the outside, but their plea was the same as you have been hearing here today. We know that the planes, this monster that the Port of New York Authority has placed in our midst, must be removed. We understand that a plane must take off at low altitude, at least these large Constellations, the four-motor jobs. We all know, too, that these planes, when taking off, their motors can cut out or anything can happen while they are taking off, while they are gaining altitude, and they must land somewhere. I think the glide of these heavy planes is negligible. I don't believe there is a glide to them. I was speaking to a bomber pilot in the last war and he told me that a bomber had no glide to it, but drops just like that. I sort of agree with him on that.

Now, we are confronted with this situation: We are not interested in what is causing these accidents. I have just said that maybe the No. 3 cylinder would burn out, or your motor could explode, or numer-

ous other causes can cause a plane to crash right in our midst. In landing, they say they can talk a pilot down. Probably that is true. What about the static when he can't hear the words from the tower? We are confronted with a monster that has created a monster, the Port of New York Authority. They have come here and told us what we can do and what we can't do. On the fringe of the Newark Airport, we can't build any, or rather we are discouraging manufacturers from coming in because we can only build to a certain level. Smokestacks, well, if the Port of New York Authority thinks we can build a smokestack about 10 feet, that is all right by them, but to go any higher they won't approve of it.

On the human side, I think that you gentlemen from Washington are all fathers like myself. If you were to visit the airplane crash, the scene of the last airplane crash, or were there at the time that it happened, you would certainly be infuriated with what went on. If you could take and put yourself in the position of the man who worked down at Singer's plant and came home and found his loved ones wiped out, his wife and two little ones, or if you were the father of the other little ones that had been wiped out, or if you were the father of those two little ones in the St. Elizabeth's Hospital who only yesterday were taken out of an oxygen tent, that would certainly hit home. Our children, in days gone by, they used to be able to look upon an airplane and thought it was a graceful silver bird. Today they look up at it in fear.

If you had a chicken farm and the hawks were busy, you would be out with the shotgun. If you had a sheep farm out in Montana and the bears and wolves were out there killing them off, you would set traps and have them shot. You would protect your own and your interests. Now, with my two children, if another plane should crash here, and let's pray to God that it doesn't, but if it does, every father will visit Newark Airport, maybe not 10,000 strong, maybe 50,000 strong, and what would happen to the Newark Airport, I imagine, would be beyond imagination, at the hands of these infuriated fathers. Even a chicken farmer or a sheep farmer wants to protect his own interests. Sheep or chickens want to protect the lives of their young. I know that every father wants to do the same. Probably I just speak for myself, but if I were called upon to help, I think I would get 100,000 strong.

The rights of the people of our city are being violated left and right. Home rule has gone. It has not only gone in our own town. To me it has gone throughout America. Where is America that used to be? Where are our great men like Washington, Benjamin Franklin, Adams, Lincoln, Nathan Hale? Let's hope, gentlemen, that when you go back down to Washington and in those halls that you tread you will feel the spirit of these great men, and if you follow the footsteps of these great men, you will give America back to the people and not to an authority like the Port of New York Authority. Help us, gentlemen, to wipe out this monster, the Port of New York Authority, that doesn't belong here.

We have got to protect our children—our children who live in fear, our children going to school. I have a little girl in school. It is an old school building, the Holy Rosary. If a plane ever goes in there, it is good-by. If the fire and gasoline ever spread there, it will be a

catastrophe that will wipe out any children in there. St. Elizabeth's Hospital and all our other institutions, and our children have got to be protected, and that is why we are calling upon you gentlemen who are fathers. Think of your own children, as I have been thinking of mine, and think of the other fathers that number into the thousands around this location because, gentlemen, it is up to you. Don't let these plane crashes come around here again if you can help it, because you can't tell just what may happen. Think of our children, gentlemen, and give America back to the people, and take Newark Airport and put it out in the sticks where it belongs. Thank you.

Senator HAND. Mr. Chairman, I see a list of other councilmen from Elizabeth. Councilman McCrann—James McCrann from the twelfth ward.

STATEMENT OF JAMES J. McCRANN, COUNCILMAN, ELIZABETH, N. J.

Councilman MCCRANN. There are about 85 of the persons in my ward who live on Jefferson Avenue. The airport is practically in my back yard. If you men would only go over there and see the way these planes take off—I would like to have the privilege of taking you over there and seeing just how close they come to the houses. You don't need an alarm clock to wake you up. I would like to say that the people of my ward are deathly afraid of this menace, and are in favor of seeing this thing removed.

I would like to say that you gentlemen are very courteous in coming from Washington to listen to our case, and as has been said before, I think the Government is the only one who can stop it. Why couldn't our Governor. I don't think there is any prejudice, but I think the Governor should be here, and I only hope you people will take the message back to Washington and do everything possible to have this airport removed. Please do something so that these planes won't fly so low. We have Standard Oil right nearby, and we have a power line there 260 feet high. They just about pass over the top. If an airplane ever touches Standard Oil, you won't have to remove it. That will do it for you.

Senator HAND. Councilman Ford.

STATEMENT OF THOMAS A. FORD, COUNCILMAN, ELIZABETH, N. J.

Councilman FORD. Mr. Chairman and honored congressional committee, executives of our State, county, and city, today, gentlemen, the seriousness of this catastrophe is expressed here today in the able representatives that we have here this morning who have given of their time and explained to you every motive of this accident. Congressman Case, Senator Hand, and the legislative body, they are today expressing to you, gentlemen, the sentiments of hundreds of thousands of people throughout this community, and it is a sad incident when we have to wait until they are brought out in boxes or coffins, and that seriousness is expressed sincerely by all these people. If any one of you gentleman saw the father following the coffin of his wife and two children after coming home from work and finding them dead and then taking them to the burial grounds, you would see how sadly this is expressed. It is too bad that we have to wait for conditions like this to exist generally before we have investigations. We have been work-

ing on this, opposing it, for the last couple of years, and at the present time we have gotten no place until this catastrophe happened.

I was very seriously interested in one of the freeholders here today, Mr. Harlich, when he expressed to you on his county map the different institutions throughout the county and the city which are affected by any catastrophe that might happen. It was fortunate, and maybe it was the fate or the will of Almighty God that it didn't hit the Elizabeth General Hospital, Alexian Brothers, or St. Elizabeth's. We have in this community, gentlemen, 21 public schools; we have at least 10 parochial schools; we have at least 20 churches. They are all in this congested area, and it certainly was the will of God that none of them were hit, and it is the duty of these people, these memorable people who come here today, the elective body, Senators and Congressmen, our mayor and other mayors who are interested in the lives of these children. Take the three institutions, for instance, gentlemen. There are over two or three hundred people who are incapable of helping themselves. If one of them hit the same as it did near St. Elizabeth's, it certainly would be much more necessary for us politicians or executives to carry the burden of these people who may have lost their lives. For that reason today I am appealing to your body. I have heard constructive criticism. I don't believe it is necessary that I repeat any of that, but I do say to your body, Weigh the facts of the assemblymen, the Congressmen, and all our other leaders; weigh that very carefully. You know that they are presenting nothing but facts to you here. These are absolute facts.

I just want to point out to you that down at the city council meeting at an indignation meeting we had practically right after it happened, a youngster asked permission to come to the floor to speak. It was granted by the president, Mr. Boyle. He walked to the microphone and he said he couldn't use large words to express himself, but he uttered one sentence, "When are they going to stop?" He turned away from the microphone, turned around and fainted and was carried out of the city hall unconscious. That, gentlemen, expresses to you people and expressed to everybody that the people of Elizabeth all have the same question: When is the next one going to happen? These are the words of that young man, because of the fact that he lived only six doors away and he had a number of children and a wife. That was the thought foremost in his mind. He could not express another word. That appeared many times that night. Women came to the floor and expressed a few words and turned and walked away. The emotion that hits the inside of them, that is passing through the lives of people today. Mr. Villani, the mayor of Newark, told you the population is sick today around here. They are sick. They are afraid. When is the next one going to happen? I say to you gentlemen in conclusion that I appreciate you coming here and compliment you because your coming in a time of necessity and coming quick, and to the Congressmen and the Senators and the legislative bodies who are sitting here, I want to express to them on behalf of the rest of the citizens of Elizabeth over in my ward that these plans are going to pass. We have been subject to them long enough. I express the sentiment of these people to these elected representatives who are being so earnest to try to relocate this airport in some other part of the country.

Senator HAND. Councilman O'Neill, eighth ward.

The councilman has requested you to have your secretary read this letter in his behalf. He has laryngitis.

The CLERK. This is on the letterhead of the City Council Chamber City Hall, Elizabeth, N. J., and signed by Howard "Pal" O'Neill, member of city council, eighth ward.

Due to the fact that I have laryngitis, would you please read this for me? As a representative of the eighth ward which is the backyard of the Newark Airport, I will try and give you an idea of how the people in this area feel. They are in the direct path of incoming and outgoing planes and are more fearful than ever on account of the two major catastrophes in the last 7 weeks. The first plane went on fire leaving the airport, and the second lost its route in the fog, entering the airport.

The airplane is a machine and as a machine there is no guaranty that the mechanism will not go wrong.

The people think it should be moved entirely from this area, regardless of promised improvements.

Thank you.

HOWARD "PAL" O'NEILL.

Senator HAND. We have a Mr. Frenkiewich of the CIO of Union County—John Frenkiewich, the president of Union County Council, CIO.

STATEMENT OF JOHN F. FRENKIEWICH, PRESIDENT, UNION COUNTY CIO COUNCIL

Mr. FRENKIEWICH. Mr. Chairman, honored councilmen, and ladies and gentlemen, I believe that I can state the real views of the citizens of Union County, because in line with my duties of the locals in Union County, I have talked with employees of General Motors, Singers, and other plants that we have—plants that we have in Union County—and they have expressed the desire for removal of the air traffic in this area. They are disturbed because, as I know myself, living in the line of the radar flight, I have been disturbed very early in the morning with the roars of the planes flying overhead. Also, I have received verification and have read the papers stating that Eastern Air Lines is contemplating a $150 million expansion program with planes that are adaptable in a short time to jet propulsion. I am a little bit afraid because, as you have heard stated here, that the Port Authority, that monstrous thing, that to maintain that, someone must be politically inclined and there must be a relationship between the Port Authority and the Eastern Air Lines or else they wouldn't be spending money of that type for expansion out of Newark Airport. That, I believe, should be investigated to see how closely allied that is, and as I have heard stated here that someone was inferring that there was political ambition, I don't think that this is sponsored or political ambition, because the petition of the aroused citizens of the county here is such that our people here are waking up and would like to have something done. We would like to thank this committee for having the opportunity to delve into the facts, and I think when they come up with a solution it will be in making new legislation to cover the outdated legislation for aircraft, new legislation governing airports and keeping in mind that most airports in the past have been outside of the city, and looking at that map, you actually don't see it, but behind that airport are many communities, and that airport is in the center of the metropolis, where it doesn't belong.

Senator HAND. We have a representative from the Hillside Board of Education. Walter Lebow.

STATEMENT OF WALTER LEBOW, PRESIDENT, BOARD OF EDUCATION, HILLSIDE, N. J.

Mr. LEBOW. I happened to be president of the board of education, and I don't want to be repetitious. All I want to do is testify to the truthfulness of the statements that were made by all of the previous speakers. I stand here not as a politician but as a member of a board of education that has been on the board for 9 years without pay. We are a small community, and I try to do my duty to my community to raise the standards of our school system so that they will be equal to any school system in the eastern seaboard. Now, all I can say is that I represent the members of the board of education who have passed a resolution similar to the resolutions that have been presented here this morning, and we are aware of the danger. We represent 3,600 school children in a direct route from this airport, and probably closer to the airport than any, either Elizabeth or Newark. They go over Weequahic Park. Let's see, now, that would be that big area directly to the west of the airport; directly to the west of the airport. It is the closest community to the airport. The minute they get over that part you are in Hillside, and I have witnessed myself, gentlemen, the horrifying experience where I woke up in the middle of the night, woke up at 1 or 2 o'clock in the morning and found the house shaking and covered my own head with a pillow thinking that the airplane would probably come right through the window. That is how disturbing it was, and you can imagine how disturbing it is to children, and the danger if by any chance an airplane happens to hit one of our school buildings while it is in session.

I think the Federal Government is interested in education and bringing up children so that they can be good citizens fighting for their country, et cetera, et cetera. We spend all kinds of money for that. This is a serious problem for the Government, to see that their nerves are not frayed and they can continue to grow into fine upstanding citizens. With that thought and with the resolution presented to Mr. Case, our Congressman, our Senator, Mr. Hand, I am very happy to be here today for one other purpose, because I have always felt that our representatives in Union County might have been a little negligent in not doing our job, but I see that the job and the obstacles that they have had to contend with, and I see that they are waging a very fine fight, and I hope that you Congressmen of this committee will help us cure this condition. Thank you.

Senator HAND. I have been requested, Mr. Chairman, to offer into the record a statement from the Union County Central Labor Union Legislative Committee affiliated with American Federation of Labor, New Jersey State Federation of Labor, Essex County Trades Council, and Union Label Council of New Jersey.

I have also been requested, I think it was by Colonel Lum, to cite chapter 34, laws of 1947, paragraph 10 relating to the present jurisdiction of the State of New Jersey over air terminals—or the lack of jurisdiction. You might be interested in that.

Are there any others who would like to be heard?

STATEMENT OF GEORGE KERR, BUSINESS AGENT, SINGER LOCAL 461, IUE-CIO

Mr. KERR. I am business agent for the Singer local known as 461. You know the Singer plant is very closely related to the airport, and a personal friend of mine, a member of our union, fellow-employee Pagoni, lost two children and his wife. I attended the funeral. It is not just the three people involved. It is about 17 people besides the father who were directly affected by these deaths. That was a very, very sad occasion, laying the two young children beside the mother and putting them into the ground. It was a sad thing, very saddening to me to see this. I worked in Singer's 15 years on the fourth floor, most of the time, sometimes a little on the fifth. There have been occasions in the past when we have stood there and a plane goes over the plant, which they do very often, especially in the very early hours of the morning from 7 to 10, and when one gets too close, the fellows say, "Let's duck, here's another one. That was too close."

Today the feeling has been changed to a feeling of semiterror. They don't know whether it is going to cause an accident, whether the plane is going to come right through the building, through faulty administration, say, from Newark Airport, being on a beam, or something of that character. I feel that way on the subject, and I want to express my opinion as a citizen rather than as a representative of the group. I feel that the Newark Airport has had a good many years to better their conditions, to see that things are safe, and it is just lucky, in my estimation, that many other buildings have not been hit.

To my estimation, some of them have come so close that they could easily touch another building. I feel that they have had plenty of opportunity to do it, and they have not done it, and there are either of two choices, go back to the old stages when China had to put a wall around the city, or get the airport out of there. I feel that you people will consider it seriously. I want you to feel that the people who vote for you, as they do for me, they feel that they can put matters in your hands, and they are putting them in capable hands. They don't put matters like this in until it is too late. They won't have occasion in the future to do that. I feel that the president of the city council said that if this should happen again we were going to put a picket line around the Newark Airport. I feel if that ever happens again, it will be goodbye airport if we have to move it by body and force. Thank you.

Senator HAND. Anyone else?

I think that is the agenda.

Mr. BECKWORTH. In behalf of the committee, I wish to say that we have appreciated the observations which have been made and the information which we are pleased to obtain. Speaking personally, I am very impressed with that which has been told us, and again I want to assure all of you that the committee will do its very best to get together and to do so quickly all the facts we can with reference to this whole situation and then try to do that which seems constructive in helping to bring about more safety, as Mr. Wolverton said, for those on the ground and for those in the air.

Thank you very much, and this adjourns today's meeting.

AVIATION SAFETY

TUESDAY, FEBRUARY 5, 1952

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE OF THE COMMITTEE ON
INTERSTATE AND FOREIGN COMMERCE,
Washington, D. C.

The subcommittee met, pursuant to call, at 2 p. m., in room 1334, New House Office Building, Hon. Lindley Beckworth (chairman of the subcommittee), presiding.

Mr. BECKWORTH. The committee will come to order.

In the study of the subcommittee so far we naturally have observed that there are possibilities that the weather in some instances could have had perhaps more effect than it may have been credited for having in regard to accidents. That naturally has brought up the question as to what is being done to be as certain as possible that minimums that are given to pilots as they fly into airports are indeed and in fact accurate minimums. The committee is interested to find out the extent to which work is being done to be as sure as possible these minimums are completely accurate from the point of view of the pilot as he flies into a given airport.

Mr. HINSHAW. Mr. Chairman, may I add to your remarks by stating that for a long time in my observation there has been a controversy between pilots in the air and personnel on the ground at airports as to the accuracy of the measurements of ceiling and visibility that has been reported to the pilots and which by law control whether or not they may effect a landing or may attempt to effect a landing. Not infrequently in monitoring the Washington approach control zone, I have heard pilots declare that while the reports received from the tower concerning the Weather Bureau's observations were grossly inaccurate, and while they were reported to have a mile or three-quarters of a mile or half a mile of forward visibility, that they at a 3- or 4-mile distance could see the airport and the runway lights, including the tower beacon.

In the accident which took place recently near LaGuardia Airport it may have been a contributing factor that has not yet been determined that the observations were in reverse, that actually the observation given to the pilot indicated better conditions than were actually available to him upon landing. That points up in our mind the need perhaps for some piece of equipment or method of observation that will give more accurate values to a landing pilot concerning his forward visibility and the ceiling. Most of those observations are taken from somewhere in the vicinity of the administration building. In most cases the administration building is located approximately a half mile from the ends of various runways. Where those runway lights

begin near water or very moist conditions, that is, during certain conditions of humidity and variations in temperature between the ground and the water mass and air mass, low lying fog conditions can exist which may not be observable from the airport tower.

Mr. Chairman, my question is, Has any means been devised for giving more accurate visibility measurements in the direction and at the approximate angle of the landing of an aircraft, and, if so, what would be its approximate cost and its practicability? These gentlemen here I understand, most of them, are very well qualified to discuss that subject with us.

Mr. BECKWORTH. Your question is understood and the first witness we shall have to discuss that is Dr. Harold Stewart of the Naval Research Laboratory, Fourth near Chesapeake Street SW., Washington, D. C. Dr. Stewart.

STATEMENT OF DR. HAROLD STEWART, NAVAL RESEARCH LABORATORY, WASHINGTON, D. C.

Dr. STEWART. Sir, the Naval Research Laboratory has been concerned with the measurement of slant visibility for aircraft since the spring of 1949, at which time we were asked by the Bureau of Aeronautics if we could devise a means which would measure or indicate the slant visibility of an airport. By that is meant the visibility of the airport as the pilot would see it. That is, in his approach to the port.

This was an urgent problem at that time in connection with the airlift. This seemed to be the limiting item of information which determined whether they would get their planes in and out or not.

During the spring of 1949 we developed one method for measuring the transmission up to any given height in atmosphere with equipments which are entirely located on the ground. We felt this approach was appropriate. We didn't feel we could project things up into the air as this would add to the hazard of an approach. So by a method which involves projecting a modulated searchlight beam upward and observing the light scattered from the two stations, one can calculate the transmission from the height of the point observed to the ground making but one assumption, that is, that stratification of haze or fog has its gradients all perpendicular to the ground. There may be layers of fog parallel to the ground but stratifications in this form are not included.

The airlift was terminated before our equipments were ready. We dropped the project with the final report.

In that summer the Bureau of Aeronautics asked us again to continue the problem because it was one of importance, the problem of landing aircraft on carriers. Our commitments at the Laboratory were such that we did not feel we could continue the work. We gave a list of people who might continue the work. By winter the Bureau of Aeronautics felt that of the people who might continue none were willing and so we took on the problem at a very low level. That is, it is a problem we are carrying in time which is available from other problems which are listed ahead of this at the Laboratory.

We now have built up at Chesapeake an equipment which is a prototype of a final one which we hope to contract for. This equipment

works at night only because we are using tungsten searchlight and two observing stations are using DC amplifier systems saturated by daylight during the daytime. With this equipment we can measure the transmission of the atmosphere up to heights of 300 feet under conditions of fairly clear weather down to visibility ranges on the order of half a mile, I would say. This is about our limit at the moment. We have tested the separate components of a daylight system using a modulated mercury arc projected in a way similar to the ceilometer type of projector. We find that the daytime equipment works as well as the nighttime equipment. We have never assembled the whole equipment. The data which our machine gives then is the transmission to any height up to whatever one chooses as the maximum. We are using it because it is important for the Navy to go to this height, a maximum height of 300 feet. We get cyclically information as to transmission to any height, all heights from ground level to 300 feet. This information is repeated about once every 2 minutes. It is a cyclic observation up and back down again.

I believe this equipment will work for visibility ranges, all visibilities of roughly one-third mile. This will work in the daytime or at night. The transmission of the atmosphere is not the only thing which has bearing on visibility. It appears whenever the solution is worked out for what constitutes visibility. Transmission appears as a dominant term or an important term.

There is also the air light which is the scattered light which is in the air in front of the pilot. A pilot sees a runway on the basis of contrast, the difference in brightness of the strip as compared to the ground adjacent to it. Superimposed on these two brightnesses is the air light, that is the light scattered up in front of them. This is a veiling haze which makes it more difficult for him in the daytime at least to see the ground or see the structure of the ground and recognize where he is.

One can, from knowledge of the transmission of the atmosphere and of the sunlight or illumination of the atmosphere or the ground, if measured on the ground, calculate from transmission knowledge alone the air light. So that taking our transmission data and applying it through nomographs or calculating machines we have gone through the calculations by hand. One can determine then what the veiling glare will be. So that we feel that the equipments which we are building for the Navy for carrier use will not only provide information as to the transmission between the position of the landing aircraft and the carrier, but this can be extrapolated at least to airports. It will also give information as to the true value of visibility based on the fundamental concept of visibility limit being established by contrast difference of 2 percent, that is, the brightness difference between two areas as seen by the observer with 2 percent as the limiting visibility.

The same information on transmission is applicable when one is concerned with visibility of lights on carriers or on the ground. Here again the transmission is an important term. The veiling glare again appears in the equations and the intensity of the light source now is important. This is separate from illumination on the ground.

Again, with knowledge of the transmission of the atmosphere and the illumination at surface when one is observing the solution can be worked out. We have only solved these things mathematically. We

have not correlated them with air observation. Solution can be worked out which will give visibility of lights, the maximum range.

These solutions depend on an assumption which is appropriate at sea in most cases, that is, that we have stratification. But we accept that, but we don't assume there are cloud light structures. All the stratification is horizontal to the extent this assumption is appropriate on the land and then this system will be applicable on the land. There are modifications of the system which I have discussed on various occasions which are applicable under some cloud conditions. I am not sure of these. I wouldn't want to commit us down at the Laboratory as being in a position to solve these. We have made an attack on slant visibility by using searchlights and two observation stations and attempting to measure the true transmission from the position or the height of the pilot to the ground after a careful study of the work which Douglas has been doing, and some of the others, feeling this was another approach and that the Bureau of Standards and the Bureau of Aeronautics and other groups working with horizontal transmissometers and the vertical ceilometer type of device were doing all that could be done. We simply took another attack.

Mr. BECKWORTH. Are there any questions?

Mr. HINSHAW. You say that involves calculating devices. I presume there is considerable expense involved in constructing such equipment even in quantity, is there not?

Dr. STEWART. I believe there will be considerable expense in constructing such equipment in quantity. I believe now, though I have not completed the calculations in connection with it, that from the transmission information and a measurement of the illumination at the deck of the ship or say at the port concerned, one can, through nomographs, find a solution of the limit of visibility. This takes time. A calculating machine will do it quicker.

Under most conditions certainly which are present at an airport you should want an answer instantaneously. Our first model of this for which we have written specifications and on which we had two informal bids—the specs went out today for bidding—two companies estimating a first model of this equipment complete through to a continuous solution for the transmission, but not including nomographs—one company estimated 1 year to produce the equipment. This would be the first model at $100,000. The second company estimated in the neighborhood of $50,000 in 6 months. These are not formal bids. When they study this more, prices usually go up.

Mr. HINSHAW. It does not include a production price?

Dr. STEWART. This is not a production price. Our specifications do not include circuits other than circuit performance, so the contractor will have to work out his own circuits appropriate to what he has available. I guess you would know far better than I how these prices would run, Mr. Douglas.

Mr. DOUGLAS. I made an estimate of $100,000 about 2 years ago when this first came up.

Mr. HINSHAW. Do you think it is practical to devise an equipment such as that for minima such as are employed in civil aviation using the figures of 500 feet and a mile?

Dr. STEWART. It depends upon the altitude of the approaching plane when he is a mile away from the port. This equipment as it stands

will be such that it will work at all altitudes higher than 500 feet. One extrapolates that information to a slant range which may be very great, depending on the approach angle of the aircraft. I do not know the answer.

Mr. HINSHAW. Has any consideration been given to a device which might reflect from a plane in landing?

Dr. STEWART. It has been proposed in the Bureau of Aeronautics and I suppose certainly in your groups, too, Mr. Douglas, that the approaching aircraft will have its landing lights on and this will be used as a monitoring device so an observer at the field could judge what the transmission is, but he will only be judging the transmission to the plane. He judges the visibility of lights. So that as an approaching plane came in with his landing light on, when the observer sees the lights on the plane it is a very good guess that the pilot will see the equivalent lights on the ground.

Mr. HINSHAW. I was thinking of an equipment on the ground that would record the intensity of a reflection from a light on the ground to a point on the plane in the event there were reflectors of designated size placed in the nose of the airplane or in the wing, so that reflection could be noted on the ground. If there was no reflection, then probably there would be no visibility.

Dr. STEWART. That is a correct assumption. I know of no consideration.

Mr. HINSHAW. It is just a thought on my part as you were talking that it is possible that some means like that for civil aircraft that might not be suitable for military could possibly work. I do not know.

Dr. STEWART. I think it would work.

Mr. HINSHAW. Of course the distance of the plane from the point where the observation is made would be a very important factor.

Dr. STEWART. Yes. Distance with the use of reflectors enters into the fourth power and with the light source enters the square. So errors in distance estimates appearing with a reflector system will be twice as great as with the light source on the plane. This may have some bearing on the plan.

Mr. HINSHAW. Let us point out for consideration in the course of this discussion and let us say that the different air carriers might have different minimums of ceiling and visibility on which they are permitted to land on given runways of given airports. The pilots thoroughly understand that situation. Then the question comes as to whether or not the weather condition is such that he does not have the forward visibility that he should have, that it is in the final analysis up to him to determine whether or not he has that visibility.

Dr. STEWART. It is up to the pilot to determine it.

Mr. HINSHAW. After the readings have been given to him under the civil air regulations as they now stand, if he does not have his minimum visibility, then of course he is supposed to get out. But there are other considerations which enter into that which frequently do take his mind off the subject. Let us point out some of the facts that apparently have been adduced in this LaGuardia case and perhaps may apply in others. That he was given a mile and a half visibility and a 500-foot ceiling, for example. The actual flier of the airplane at this point happened to be a pilot who was checking out on this certain airplane and with him was a check pilot. The check pilot

says, "I can see it." The other fellow says that he does not. There is a question of responsibility, but at the same time he is coming in on instruments. His eyes are glued on the instruments. Obviously he cannot land on the runway unless he can see it in his field 15 or 20 seconds of approach. At some place he has to know whether he can make that landing, does he not?

Dr. STEWART. Yes, sir.

Mr. HINSHAW. He may have seen the lights farther back, but the fog could have moved in under him while he was checking his instruments. But he is so close he thinks he is still on course, and at the proper altitude and attitude for landing.

Is there some way in which those final facts can be determined with any degree of accuracy?

Dr. STEWART. There is some way. It is simply a matter of finding it. I am confident of this, but I do not know the way offhand.

Mr. HINSHAW. All of those conditions are marginal conditions for every flier. It is the in-between. It is the point where decisions have to be made, and made very quickly. Very frequently if his forward visibility is given to him by the Weather Bureau from their point of observation it is clearly above his legal minimum. He is entitled to attempt a landing unless of course he cannot see what he is doing.

Dr. STEWART. It has been our approach to this problem that a reading of visibility and a reading of cloud height does not give a solution as to visibility from a position other than on the surface of the ground. Cloud height, while it has bearing on the change in visibility away from along the ground, it does not, as I see it, give a solution or warrant advising a pilot of his visibility when he is, say, 200 or 300 feet above the ground.

The ceilometer, which is an extraordinarily fine equipment, still does not give you an evaluation of the gradations in fog density with altitude. It tells you essentially the bottom of a dense cloud area. So that while you may determine visibility along the ground and say it is a 2-mile visibility, from a height of 500 feet the visibility may be down to half a mile. The ceilometer has not cut you in and said that you are above cloud ceiling.

Mr. BECKWORTH. Do you conclude from what you have said that as the situation is today there is a great chance that huge errors can be made as one receives the visibility and what it is supposed to be?

Dr. STEWART. I conclude this unfortunately from a study of the problem without any study of data pertinent to the problem. Again I feel Mr. Douglas is far better able and some other people that work on the west coast are better suited to discuss this than I.

Mr. BECKWORTH. Naturally before you do a lot on a problem like this you have to appraise the bigness of the problem. Unless there is a great likelihood that much error can be made today in the evaluation of the minima, you would not really have a problem. But you pretty well concluded that considerable error is likely at times.

Dr. STEWART. That is so. We have concluded this. Certainly the persons who asked us to go into this included it.

In carrier operation, the only thing I know a little about, this is an appropriate conclusion. Carrier operation, when it is making in fog an aided approach with radio techniques, that is, but because carriers roll and pitch, no one is going to land without seeing his way around

at this stage of the game. We are to provide information such that the pilot can break away from his radio aids to landing and be assured at the time he breaks away he will see the carrier. He is not to have to look away and look back.

Mr. BECKWORTH. Is the instrument you are talking about one designed for the most part to take care of any poor visibility situation, regardless of the suddenness of the change?

Dr. STEWART. No, sir. The instrument has its cyclic time of 2 minutes as presently designed, and assumes that things are unchanged in that period of time. The instrument is very well suited to the carrier because the carrier has sailed through the very air that the approach is made through. The carrier sails upwind and the instrument has had an opportunity to study the conditions behind the carrier. The carrier operation is very nice, incidentally.

Mr. BECKWORTH. To what extent have you attempted to get information as to the importance of the element of suddenness of change in visibility? To what extent have you been able to get information as to the importance of that?

Dr. STEWART. We have studied atmosphere data taken aboard ship in fog and haze, and concluded from those studies there are not abrupt changes at sea. My experience is limited on that.

We have proposed and are at present planning to carry our first working model of this equipment to sea and find out if this condition of rather stable weather or stable fog is persistent up to the heights that are important to us.

Mr. HINSHAW. I think that is all I have.

Dr. Ben Haynes has said that the weather observations made in the civil section of aviation frequently made from administration buildings or near control towers that under certain conditions in the past, if not at the present time, that they have actually sent their observers to the ends of runways. But every observation necessarily depends upon the observer himself and the thing he is observing as to whether or not he recognizes that object to be at a given distance, at a known distance from the point of his observation. That is where the disability comes in.

You either have to send somebody out to the end of a runway a half mile away to look at something which he has to recognize in order to determine the degree of visibility, or else rely on some other means. It is entirely a human thing. It is not always possible to send an observer to the ends of runways. It depends on how many observers are on duty and how important it is thought to be as to whether or not the observer is sent to the end of a runway to observe the direction of flight.

Then there is the other question as to whether or not there is an object in the direction from which the flight is coming which can be recognized to be a specific distance away in conditions of haze and fog. If the airport should terminate on or near water, obviously there would be no object over the water which would be stationary, unless it might be a distant bridge or something of that sort, which one would use for judging.

So it makes a very difficult determination. Whether or not this can be resolved into a piece of mechanical or electronic equipment, I

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think we ought to inquire around among these gentlemen to see whether somebody else has an idea which might be of assistance.

Mr. BECKWORTH. I wish to get this straight. So far you have not explored the adaptation of your instrument to what might be termed the needs of civil aviation or airports that civil aviation uses?

Dr. STEWART. We made a preliminary exploration of that in connection with naval ports ashore. We felt that the slant visibility technique, the measurement technique we proposed is still applicable and should be supported by two types of measuring instruments—one very similar to that of Mr. Douglas, one which measures the transmission along a surface, and a second one which measures the air light along a surface.

One finds in a study of daytime operation almost invariably air light in fog is the limiting thing either of lights or of structures. We felt a direct measurement of this made horizontally could be extrapolated to a position of the pilot, through a knowledge of the transmission of that. I believe this is a valid extrapolation. However, again we have not accumulated among ourselves any information as to cloud structures, variations in this uniform stratification assumption.

Mr. BECKWORTH. Assume that the $100,000 instrument you mentioned is completed a year from now, as you understand it. Do you feel that it would do civil aviation at airports, say within the United States, a lot of good or not? You may not have explored that.

Dr. STEWART. I think we would be at great fault if we didn't check the instrument in this connection. On the basis of that I would rather not give the answer.

Mr. BECKWORTH. Thank you very much for your presentation.

Mr. Charles Douglas, of the National Bureau of Standards, Connecticut Avenue at Van Ness Street NW., Washington, D. C., is the next witness.

STATEMENT OF CHARLES DOUGLAS, NATIONAL BUREAU OF STANDARDS, WASHINGTON, D. C.

Mr. BECKWORTH. You have heard some of the questions we have raised. With that in mind you may feel free to proceed in the beginning as you see fit.

Mr. DOUGLAS. We have been involved for the past several years in work from funds provided by all of the interested agencies—the Weather Bureau, the Civil Aeronautics Administration, the Navy, the Bureau of Aeronautics, and the Air Force—in the development of instruments for measuring horizontal transmission of the atmosphere and in certain phases of airport lighting.

As Dr. Stewart has ably presented the over-all picture of the laws governing visibility, I will not go into that. Our instrument measures only the transmission along a horizontal path. We have found in many cases, particularly at Arcata where much of our experience has been accumulated, that the atmosphere is not always smooth horizontally but is similar to the broken type of clouds you see in the air. You have a mass of fairly uniform density both vertically and horizontally and a relatively clearer space, or more dense, and so on.

So we feel that an instrument should be continuous in its recording, that the record of past history is very important in any of these operations. Past history means maybe 5 minutes; that the minimums

for any approach in marginal conditions should be made or determined for that particular approach and not for a period of time previous to that. Conditions change very rapidly. I brought one illustration down with me. This is taken at Arcata. This is the horizontal transmission during a period of time. You can look at this chart I have here and see what I mean.

There are four instruments alike around the field. Here is another case on this where we had a fog which lasted about 15 minutes. Notice that the drop is almost as fast as though the lights are out. The one in the touchdown area shows scarcely anything. The touchdown area was open, although the tower would have been reporting maybe 300 feet visibility. The touchdown area was something in the nature of 2 miles. There is about three-eighths of a mile distance between the tower and the touchdown area. We feel whenever a request is made for clearance if you are on the course of one of these sudden rises or decreases, you should wait until you see what is happening; that an instantaneous observation there might be completely misleading. You might hear and say that the field is open. Half a minute later it is completely closed. Therefore, it takes more than one instrument in many locations.

There may be a situation where the atmosphere is uniform so you do not have to use but one measurement, but covering the full approach zone and the touchdown area of the field. If any one of those instruments, 2, 3, whatever the determined operation is, if any one shows conditions of low minimums just picking a figure of 3 minutes or 5 minutes, your below minimums for the field, you have some place in that vicinity with something moving across the field which is below minimum. It might be at the critical point at the time the plane gets in there. This rapid change in fog is a characteristic of many locations. We even see it here in Washington at the Bureau of Standards.

Mr. HINSHAW. What type of instrument is this?

Mr. DOUGLAS. This consists of a light source operating at constant intensity, a photoelectric receiver at a given, fixed distance from it, and an indicator which may be located at any distance you desire from the light source receiver range. Therefore, we have a remote indicating instrument which records the horizontal transmission directly. You can make assumptions as to the laws concerning the visibility of lights. We have been primarily concerned with the lights along the runways and not the runway markings. Or you can gain operational experience as was done in Arcata, taking the reports that the pilots made as to when they first saw lights, what distances the lights were, and relating it to the horizontal transmission measurements. On the basis of such measurements at Arcata, the meteorologists there recommended sometime late in 1948 that such an instrument program be considered for adoption. He recommended the use of two instruments, plus one ceilometer in the approach zone. That would be a standard type as far as the equipment was concerned, but would operate on a faster cyclic time than the present ceilometers and with shorter base lines, so it would be applicable to denser weather and lower ceilings.

We will be able to measure with such devices at this, sets that were set up at Arcata, the visibilities down to the order of 300 feet by day and 500 feet by night. This is lower than we need to consider at the present time. But it is also the ultimate in the instrument program.

Mr. HINSHAW. Mr. Douglas, I think that is very interesting, but you are talking about something that is in the vicinity of the airport. A pilot coming in over the water, however, the conditions through which he is going may be wholly different than at the airport.

Mr. DOUGLAS. It has been our impression that the cost of installation of any such type of equipment like that would probably limit it to one runway, the instrument runway, and there would be an approach-light system on that runway. The Weather Bureau has installed a transmissometer out in the zone of the middle marker at National Airport. That is 3,000 feet, roughly, from the shore. It was put there for the approach-light system.

Mr. HINSHAW. Let us say a pilot's minimum is 500 feet and three-quarters of a mile. In conditions of daylight, for example, which obviously is the most difficult—I mean daytime—when the light which comes through from above has to some degree saturated the atmosphere through which you are flying and hence made it reflect a lot and made it very difficult to make readings, would there be enough difference of intensity between, let us say, the landing lights of an approaching airplane at three-quarters of a mile or a mile to be recorded on a selenium, or whatever you use at the end of a runway?

Mr. DOUGLAS. I hesitate to give an offhand answer, but I believe the answer would be no. In order to avoid most of the effects of daylight you would have to restrict the field of view of your photoelectric receiver to a very small angle.

Mr. HINSHAW. Suppose you restricted it to the field which was covered by the ordinary precision landing equipment.

Mr. DOUGLAS. That would be too large. You would be measuring almost entirely the effects of the daylight. Three-quarters of a mile here—in the field of view of a transmissometer is the order of 50 to 100 feet, it would be very difficult to restrict the field of view of a photoelectric device and still be possible to aim the airplane.

Similarly, the changes in the attitude of the plane will change the amount of light that it is directing toward the photo cell. The landing light has a relatively sharper beam and a slight change in attitude would make a very considerable difference in the amount hitting the cell. Of course, the plane will be moving. So if you had a device with a fast enough time response, so you could see the maximum reading you obtain over a period of 3 or 4 seconds, that would get rid of part of this problem of not having the same intensity directed at the photo cell at all times.

We have used an instrument such as this, which is a relatively sensitive photoelectric device but not the most sensitive type with base finds of the order of three-quarters of a mile, three-quarters of a mile separation between the receiver and the light source. In such cases we use a projector which is a 24-inch aperture reflector having an intensity of 8 to 10 million candlepower; whereas, a landing light has an intensity of around 600,000 candlepower. Even with fixed conditions on a restricted field of view, we still, at three-quarters of a mile visibility with three-quarters of a mile separation, are getting a reading which has a fairly large component due to daylight which we obtain by turning the light off and measuring both conditions.

Mr. HINSHAW. Obviously the pilot coming in for a landing, when he has reached his minimum conditions, say it is three-quarters of a mile at 500 feet or 400 feet, is supposed to be able to see the field, at

least see the outline of the runway. That is the object of a determination in advance as to whether or not he has that much visibility. Otherwise, perhaps he should do something else, take an alternate or use some other runway or something of the sort.

To obviate some of these difficulties where, let us say, the observer for the Weather Bureau gives either too long a report of visibility or too short, it seems to me there might be some simple device made that would assist and hence obviate some of these difficulties.

Mr. DOUGLAS. If it could be made it would be highly desirable. Probably there are elements which we are not employed now which would make it more readily possible. But the eye is a remarkably sensitive device, and it is very hard to get an electronic device that compares with the eye in pick-up.

Mr. HINSHAW. Everybody knows of the condition where the tower, let us say, reports that visibility is zero, but he just has a bank of fog around the tower. It has not quite moved out. Everybody knows the situation where the tower thinks that something is open but a bank of fog was moving in on the runway. Somewhere in there there might be a determination.

Mr. DOUGLAS. We feel on the basis of operational experience gained at Arcata that measurements either by an observer or by an instrument in the approach zone and near the touchdown area of the runway are far more significant than observations made from the tower in the cases where the fog is moving in and out.

Mr. HINSHAW. In the instant case we are thinking about I believe that the next weather report made 10 minutes later changes the visibility from a mile and a half to half a mile, and the ceiling from 500 to 600 feet; that was within 10 minutes. Obviously that is a terrific change.

Mr. DOUGLAS. I have seen them faster than that.

Mr. HINSHAW. I am talking about the report. Actually the change took place a lot faster than the reports.

Mr. DOUGLAS. There have been cases of planes starting a contact approach with the field above minimums and been frozen through an alternate before he got down to the minimums. The atmosphere changes very rapidly at times. That is why we feel that whatever reporting system is used, you need a report for each particular approach under the conditions of minimums or marginal conditions.

Mr. BECKWORTH. Did I understand you to say that it may require three instruments to do the job?

Mr. DOUGLAS. I stated that. There may be locations where conditions are uniform enough so that one will be sufficient. At Arcata, based on work there, the station recommended two. I can foresee missions where we might need one more.

Mr. BECKWORTH. The two have not been made yet?

Mr. DOUGLAS. Yes.

Mr. BECKWORTH. They are in being?

Mr. DOUGLAS. We have prototype instruments reporting out there throughout the course of the station. Some of those are now operating at the Naval Air Station at Patuxent River and at National Airport.

Mr. BECKWORTH. How long have they been operating, the ones you are talking about? Your experience has been how long?

Mr. DOUGLAS. Five years or six years. At the same time the Air Force has requested us, and we are procuring for them, a total of 25

such instruments at the present time. They are just coming off production.

Mr. BECKWORTH. That would indicate that they are reasonably practical, then, so far?

Mr. DOUGLAS. We feel they are. We do not feel they are the ultimate at all; that work of a type Dr. Stewart is doing may develop a much more accurate type of device to take care of these conditions where the fog is not uniform vertically.

Mr. BECKWORTH. Within the 5 years have any rather startling developments taken place that have brought about a lot of additional improvements?

Mr. DOUGLAS. No. There has been continual improvement. Our work in the past 2 years has been more of an engineering-type work, getting from the laboratory something which could be operated by field personnel rather than laboratory personnel.

Mr. BECKWORTH. You mentioned you think the observations made from a touchdown area on an airport are very significant compared to those that might be made at the administration building.

Would you elaborate on that just a bit?

Mr. DOUGLAS. That is based upon the Arcata experience where we have found in many cases the visibility at the tower just did not correspond at all with that at the touchdown area or in the approach zone. Conditions can vary along the runway, so that the center of the one runway might have 500-foot visibility and out in the approach zone 2 miles. I found such an example this morning in reviewing some of the tests. Five minutes later it may be down to under 500 feet.

Mr. BECKWORTH. The Weather Bureau has all this information that you have available?

Mr. DOUGLAS. The Weather Bureau is procuring two instruments of the same type to install at National as soon as they come off the production line. They are using our laboratory instruments waiting for the others.

Mr. HINSHAW. Can you give the committee any idea of the cost of the production article?

Mr. DOUGLAS. The production article will cost around $2,500 per instrument. This does not include any ceiling measuring equipment. We are thinking only of the horizontal transmission measuring equipment. It would require a single pair of conductors from the instrument to the tower to operate. The cost of putting that in depends upon whether it is put in special or with other wiring in the field.

Mr. BECKWORTH. How soon in months will it be before the 25 instruments of which you speak are available?

Mr. DOUGLAS. It is more of a period of weeks than months. They are coming off the production line now.

Mr. BECKWORTH. You stay in constant touch, I suppose, with the Civil Aeronautics Administration with reference to what you find out and particularly that which is concerned with the significance of the touchdown areas as compared to the administration building?

Mr. DOUGLAS. Yes. We have done that. We are trying to keep everybody informed about the work. Most of our work has been done on funds transferred by all of the agencies, so they are all interested in it. The Civil Aeronautics Administration now has one of the experimental units at Indianapolis.

Mr. BECKWORTH. You certainly feel that what might be termed an extraordinary effort such as the one that Dr. Stewart referred to is justifiable because of the great difficulty with this kind of problem?

Mr. DOUGLAS. Definitely. While it may appear our work is overlapping, actually it is running more on a parallel and we are supplementing each other's work insofar as possible. Some are different methods of attack, different basic assumptions. We hope that with one or the other, or between the two there will be the solution to the problem.

Mr. BECKWORTH. Thank you very much, Mr. Douglas.

The next witness is Mr. Haynes of the United States Weather Bureau, Twenty-fourth and Twenty-fifth Streets NW.

STATEMENT OF BENJAMIN HAYNES, UNITED STATES WEATHER BUREAU, WASHINGTON, D. C.

Mr. HAYNES. I believe Dr. Stewart and Mr. Douglas have covered fairly well the theoretical aspects of the instruments that are now in existence. The Weather Bureau has been working cooperatively with the Civil Aeronautics Administration, the Civil Aeronautics Board, and with the Air Transport Association for the last 3 or 4 years in trying to find a solution to this very complex problem. We feel that it is more than a problem of merely observing the weather. As Mr. Douglas pointed out, weather does vary in time. It also varies in distance.

We feel that unless we solve the variation part of the weather we will not have the whole answer. For that reason we set up the end of the runway project to show what differences there were between observations taken at two points roughly 3,000 feet apart. So that is and does become operationally significant, but it ties in even closer than that with the actual operation during a landing. It involves the pilot and the controller and becomes a problem, in addition to that of observation, of forecasting. If we are really to have the aircraft over the airport and at a time when visibility is sufficient for a landing, then we must know in advance what the visibility will be, because at some point during the approach the pilot must make a decision whether to continue and land or to go around again. That point must not be based upon old data—10 minutes old, 1 minute old, or even 1 second old. It is the data that is applicable at the time he comes over.

The Weather Bureau is studying this problem both from a variation in space and a variation in time standpoint, and we are working with various subcommittees of the airlines and of the Civil Aeronautics Administration and the Air Transport Association to see if there is some way that we can bring all of this together in one single system, because we feel that we can no longer say, "The meteorologists tell us what the visibility is. The controller will keep the aircraft separated. The pilot does his business. Let him base it on using any data that he wishes." The thing has to be done on an integrated plan of approach. We have a project at the National Airport, in cooperation with the Air Navigation Development Board, on a transferred funds basis—an intensive investigation into the usability of the transmissometer, the remote ceilometer, as Mr. Douglas has pointed out.

We have equipment located out in the river on the middle marker, both a transmissometer and a ceilometer and we send an observer to the end of the runway in addition to that during all conditions of low ceiling or low visibility. We are trying now to work an integrated plan to find out just what we do need in the way of weather observations in order to analyze the problem meteorologically to give the best type of information, both to the controller and to the pilot.

We are investigating, in addition to the present transmissometer and ceilometer, a new type of ceilometer which is a rotating beam. You are all familiar with the vertical beam sticking up near airports as you approach them. You will now begin to see at National Airport during low conditions a beam that revolves. In that way we have made a more sensitive instrument and we have made it possible to scan once every 24 seconds rather than the sweep period of about once every 6 minutes, on our high-speed type of standard ceilometer.

So we are getting the period down to within the realm of variations in the atmosphere itself. This transmissometer does measure continuously, as Mr. Douglas pointed out, on a record.

In addition we are testing an instrument built for the Signal Corps and it uses the principle of a pulsed light. It sends a beam of light up to the clouds and receives it back at its own receiver adjacent to it. It is similar to radar except it uses light. We measure the pulse time in the light beam going up. The nature of the return and the nature of the base of clouds is detected by various electronic systems. It may often be something very difficult to analyze. It is not a simple thing; you do not measure a flat ceiling. You measure a return of light from a cloud base which may have all gradations of variation from a very sharp base to a very diffuse base extending all the way down to the ground in the form of fog. The variations are tremendous and it is our business now to try to unravel these variations from a practical point of view to determine what we are measuring specifically with the various electronic equipments.

We are also investigating the use of television. I smiled when Congressman Hinshaw said, "We have a way of detecting an airplane from the ground." Yes, we look at it with a television set. In the GCA radar as soon as he sees the light appear, he marks a spot on his screen. He knows the exact position of the airplane. Therefore, he knows exactly how far the plane is away from the spot when it appeared on the television screen.

We are investigating the use of television as a method of observing remotely the visibility both of light and during daytime under various conditions. In other words, we want to have something that might even be applicable to transmission to the pilot directly so that the pilot does not have to wait for a machine to solve the problem, for somebody to code it in the form of a report and transmit it by voice or other methods, by radio, to him. The presentation may actually be carried on the pilot's screen of his own television receiver, let us say.

That might tie in eventually with the all-weather navigation system in which the pilot might also have a view of the screen of the radar at the station which would show the position of all other aircraft. So we are trying to solve the problem. It is a difficult one. This year we hope to make some progress, but it is a long, slow battle.

As far as the Weather Bureau is concerned, we have had excellent

cooperation both from Mr. Douglas and also from the Navy Department. We are informed of Dr. Stewart's work and his problem was a different one. The aircraft carrier does sample the atmosphere that the plane goes through as it passes through the same air path in its motion during the landing procedures. We need a device that is not so dependent on a short sampling path. Everyone here has mentioned the variations. Whenever we set up a base line for anything as a transmissometer, let us say we have a 600-foot base line between the projector and receiver. Let us say the transmissometer is located 8 feet above the ground. All that tells you is a specific bit of information about that particular path of light 8 feet above the ground and over that 600-foot path. A bank of fog may roll up right next to the transmissometer and it will never even see or smell it.

So that we need to go beyond just these small sampling devices. Maybe one transmissometer is not enough. Maybe 10 will be necessary. Maybe one that scans a number of light sources rather than only a single light source is necessary, light sources being at varying distances. I believe that Mr. Douglas has worked on some of those ideas.

A numerical value is, of course, a desirable value. That is why we have been more or less shying away from television, because it is again a subjective thing, but still we cannot overlook any possibility in the field. As you all know, in looking at baseball and football games we feel that television does tell you what the weather is doing. You can see what the visibility is pretty well, but we need to develop an approach. We need to calibrate. We need to develop specific television for our purposes and not for the purpose that it has already been developed for.

We feel that we are not too far away from answering some of these questions but that actually a lot of effort still remains to be put into the picture regarding the use being made of the data. How can this data be used in an integrated fashion for not only pilot safety but for control purposes? We have minimums. What do they mean? Do the minimums have any meaning at all? How can we make minimums have meaning? Those are the questions that we are working on very closely with the Civil Aeronautics Board and the Civil Aeronautics Administration in an effort to try to solve. In other words, if there is an answer to the problem, we hope to find it.

Mr. BECKWORTH. You have from time to time called international weather conferences; have you not?

Mr. HAYNES. Yes.

Mr. BECHWORTH. Have you been able to find out whether or not other countries have surpassed us in obtaining answers to problems like that, or is that kind of thing ever discussed at these conferences?

Mr. HAYNES. Yes. We are following the work of the British very closely. As you probably know, there is a report of the accident which occurred at London Airport. That accident caused this report to be written. It went into this whole problem of integrated control very thoroughly. They came up with the answer of merely placing an observer at the end of the runway to report runway visual range—just visual range down the runway. They felt that was the most essential piece of information that should be continuously given during the final approach. Conditions in London may be different than conditions that we experience in various parts of the United States.

We may find we cannot do it by sending an observer to the end of the field.

There are difficulties there as well, but still it may be the answer in the long run. We may be developing all these fancy equipments and still find it economically cheaper to send a man out there during the actual relatively small percentage of time these conditions are in existence. The British have looked at it that way; that they cannot solve it with an instrument. They say, "We will send a man out there." Manpower in Europe seems to be plentiful.

In this country we are being squeezed daily to reduce manpower. So that at the present time at our airport stations if the Weather Bureau were to assume the full task, we would just have to say it could not be done because it would mean carrying a staff almost full time to cover those rare periods that might develop at any time.

Mr. O'HARA. Let me ask you a question with reference to the operation of stationing a man at the runway. How does he communicate with the tower?

Mr. HAYNES. By radio telephone.

Mr. O'HARA. Then the tower communicates to the pilot?

Mr. HAYNES. That is right; through GCA.

Mr. HINSHAW. I might have mentioned television as the most interesting thing. I suppose one of these small television cameras of the industrial type probably could record the lights of an oncoming airplane at some specific distance?

Mr. HAYNES. Yes.

Mr. HINSHAW. Unless those lights were visible at the proper distance over the television, the visibility would be down?

Mr. HAYNES. We thought of using a binocular system, placing two televisions at an angle while they would actually give quite a vertical path. The triangulation or range-finding device could be used to actually alert at a given point.

Mr. HINSHAW. If the television screen is placed close to the GCA scope, then when the oncoming airplane reaches a certain point its lights should be visible in the screen to the operator of the GCA?

Mr. HAYNES. That is right.

Mr. HINSHAW. If they were not visible, then what?

Mr. HAYNES. As was pointed out by Dr. Stewart, he could probably see you. We still have not experimented enough with television to know what actually would be possible.

Mr. HINSHAW. Has the television camera been tested to the lights of the oncoming plane in daytime as well as dark?

Mr. HAYNES. No. We have only made observations from a fixed studio looking in a particular direction at various lights, objects, and so forth, but not under all weather conditions as yet.

Mr. HINSHAW. I think that has a lot of possibilities, Mr. Chairman. I hope they can go forward with some actual tests on an instrument runway.

Mr. HAYNES. We hope to do that.

Mr. O'HARA. Are you a pilot?

Mr. HAYNES. Yes.

Mr. O'HARA. What is your problem involving where the air above the runway is perfectly clear and you have snow or sand blowing across the runway so the pilot cannot see that runway? Have you any remedy for that?

Mr. HAYNES. No. That is one of the problems that probably cannot be solved by some of these other direct methods. But possibly by television you could actually see what the runway would look like. In other words, having a camera pointed down the runway he would actually see the runway was not identifiable. I know that blowing snow is a very bad condition. It just obliterates the ground entirely. It creates a false impression.

Mr. O'HARA. I am thinking of the condition that we get up in Minneapolis once in a while. Of course, the important thing is that the pilot can see down the runway, too.

Mr. HAYNES. The pilot may often be able to see the runway very clearly at distances above the runway, but when he comes down it may be completely obliterated.

Mr. HINSHAW. I think these developments are very interesting. For on my part I hope they go forward with all possible speed.

Mr. BECKWORTH. What type of directive, if you want to call it a directive, or caution do you tell your people out on the field, your Weather Bureau representatives at the airports to try to adhere to with reference to these changing conditions, these rapidly changing conditions or the possibility of errors so far as the information they give to the pilot as he relies on that information?

Mr. HAYNES. I wonder if I might have Mr. Stromswald report on that, because he is familiar with the details that we give the observers. It may be well to get his testimony on the record in that respect.

Mr. HINSHAW. I have no more questions of this witness.

Mr. BECKWORTH. Thank you very much, Dr. Haynes.

STATEMENT OF HUGH STROMSWALD, UNITED STATES WEATHER BUREAU, WASHINGTON, D. C.

Mr. BECKWORTH. You heard my question, Mr. Stromswald.

Mr. STROMSWALD. Yes. I wonder if I can briefly review our operations with respect to the runway operation or observation project before I answer your question.

In 1948 we began cooperation with the Civil Aeronautics Board, the Civil Aeronautics Administration, and the Air Transport Association with this experimental project out at National Airport just to see what the differences were between our observations at the terminal building and at the runway. We did it solely by observer means. We continued that project for about a year. I have here findings of the differences which we would be glad to leave with the committee. It bore out what we had probably known all the time, that differences could be rather large and highly significant.

(The material referred to was placed in the committee files.)

Mr. STROMSWALD. As a result in late 1949 with these other agencies we paused to take stock of the situation to see what we could do. We are faced with the economic situation that we could not possibly have a man out there all the time. Even if we could at National, we could not do it everywhere else. We turned to a general instrumental solution. We developed this ceilometer and we took the transmissometer and made these installations. That project is still in operation.

During this project and as a general field practice under all the circumstances we instructed our observers that we consider weather

observations to be their most important during a critical situation. That means those are standing instructions to them. We have certain specific instructions that when certain conditions occur they are to be alert for them. When they do occur, report them by means of special observations on the teletype. Those are the instructions. Actually we have some limitations on them.

We have other duties. Many of them are not even connected with aviation. As a result, from a practical point of view we cannot keep a continuous watch under all circumstances. We have got to stop and answer the telephone and do other things. As long as we are not staffed to maintain an observer solely for that purpose, we cannot promise to report changes immediately.

Mr. HINSHAW. Let me pause here to point out upon inquiry by this committee at LaGuardia Airport it was learned, according to my understanding, that during these periods of low visibility and marginal visibility that observations made by the tower were to be accepted. In other words, the tower operator was deputized by the Weather Bureau to make an official observation which he transmitted to the Weather Bureau. The Bureau may or may not make an immediate check, depending upon their circumstances in the office; but in all events it went on to the teletype and the telewriter immediately and become official. That was a tower observation which obviously is made at least half a mile from the end of any runway.

Mr. STROMSWALD. That is correct. It is an observation of visibility only. The ceiling observation is made by the weather man. The reason for that set-up is that we felt the control-tower operator was in a position to maintain a current watch of weather conditions, and was in a better position than we. We made that arrangement in order to accomplish that.

Mr. BECKWORTH. Do most of your representatives at these airports have a thorough understanding that at times there are possibilities that what they are telling the pilot and what the pilot receives will contain errors and do they make a proper provision for the pilot to show there is a chance of a mistake being made? Is any attempt made along that line?

Mr. STROMSWALD. We have several reporting procedures in which we attempt to take care of that. One is we have a procedure for reporting variable visibility. When ceilings are changing, it is obvious we cannot report continuously. We send in a code symbol indicating variables and we indicate by remarks the range through which we observed the variables while we were attacking the observation which may be from zero to 3 miles. We make rather copious use of remarks.

If it is at a different level, we do that. We have the control-tower visibility operations. Our people at the Weather Bureau also take visibility observation concurrently. If the visibility at the control-tower level differs from that at the level our people are at, we send the visibility at our level in "Remarks." It is generally conceded it is not as significant under those circumstances as a control-tower report, but under some circumstances it is.

Mr. HINSHAW. Mr. Chairman, I would like to ask a question which may require an answer with some technical information in it. Where you have a water surface off an airport, am I correct in the assumption where the water is colder than the air above it and the air above it is saturated, or very nearly saturated, that a fog can arise?

Mr. STROMSWALD. Yes. We had this situation here to a limited extent which you will see in this report.

At the end of Charlie 36 right by the water there I am speaking about. You will notice in the visibility report in some instances there was a pretty good fog bank at the end of Charlie 36 which was not reflected by the report at the terminal building.

Mr. O'HARA. If you want some expert testimony on that, I drive along the river every morning when that condition exists. You have fog rolling down the river. Sometimes it comes across the drive. I presume that the runways up there at National Airport have the same thing. Is that right?

Mr. STROMSWALD. That is correct.

Mr. HINSHAW. We have to make some further inquiry concerning the situation which we were looking into in New York at LaGuardia Airport. But I inquired of the weather observer on the second floor or the third floor of the administration building what points he uses in day and night time to determine what the visibility is. He pointed out on a chart which he had on the wall certain objects at known distances from the tower. Obviously with his observing point as much as 50 or 60 feet above the surface of the airport from the water, his observations might be entirely different from what they would result in at the end of the runway or the touchdown end of the runway. When this condition Mr. O'Hara describes is likewise in being considerable hazard arises in making such observations and putting them out as official because there is a certain motion to this fog that is rising off the water. If for any reason the wind should cease for the moment, is there a probability of a build-up of that fog vertically?

Mr. STROMSWALD. There certainly is a possibility.

Mr. HINSHAW. The reason I ask that is because the wind in this particular case was given as 4 miles an hour. Obviously that stuff can pile up over the water and reverse itself and come in with that very small wind.

In this case I believe the testimony given to investigators showed at the time of the accident a vessel on the water was barely able to make out the type of the ship at a half mile, and that when the next weather observation was made, the observation showed a half-mile visibility, which indicates there was this disparity between a half mile and a mile and a half between two adjoining reported observations.

Mr. STROMSWALD. You will see these time graphs on this report here one following the other. Changes at Charlie 36 reflected a few minutes ago reflected at the terminal building and vice versa.

Mr. HINSHAW. Aside from all of the other factors involved, that poses an extra hazard to the pilot on landing. What his duties may have been is still another subject. At the same time it does pose that problem. You think some of these devices might be able to materially assist in decreasing that hazard during marginal conditions?

Mr. STROMSWALD. Yes, sir. The working group that considered this problem after approximately 600 observations at Washington National came to this general condition. While the runway observations were certainly not the ultimate answer to the thing, telling what a pilot would see, it was a large step forward which would materially assist operations.

As the report shows, that opinion was concurred in by the operational interests, the Air Transport Association, the Civil Aeronautics Board, and so forth. I think that is the general opinion. We have made some big steps forward. We do not have a perfect solution yet.

Mr. O'HARA. Might I ask a question with reference to the location of your observation towers or your landing towers? I have heard commercial pilots complain about coming in to land and they had perfectly good visibility of the landing strip, but the tower was maybe fogged in. They would wave them on.

It seems to me that there is something to be considered in the matter of location of both observation towers and landing towers. They are usually off to one side of the field and they are paralleling the runways. The ends of them are not clearly visible to them as they are to the pilot. I realize these instruments, if they work out, are going to be a tremendous help. That is a perfectly practical problem that we have here.

Mr. STROMSWALD. That is correct. These officers perform multiple functions. As far as the control towers are concerned, the Weather Bureau has no responsibility as far as their location is concerned. I think they are located largely on other considerations. The Civil Aeronautics Administration people will have to speak on that.

As far as the Weather Bureau is concerned, we make a definite effort to locate our office at a place where we can have a full view of the field and have ready access to the ground and be aware of everything that is going on. It is an idealistic point of view and we have not been able to do it at all places.

Mr. BECKWORTH. Mr. Wolverton, do you have any questions?

Mr. WOLVERTON. No. I unfortunately have not been able to be here continuously as I would have liked. There was one thought that has been in my mind ever since we were at LaGuardia Field that I would like to be clear on if it is possible to do so. Maybe you have had testimony today that has dealt with it. But we learned there that in the approach that resulted in a crash in the water that one pilot observed the lights of the runway and so called them out. The other pilot did not observe the lights and continued his approach on instruments. The other pilot checked and saw the lights again and checked again and saw the lights rapidly rising. Yet they continued to approach on instruments.

Could you account, on the basis of weather conditions, for that difference in observation of the two pilots?

Mr. STROMSWALD. No, sir. They were in the same cockpit, presumably.

Mr. WOLVERTON. Yes; side by side.

Mr. STROMSWALD. I would not attempt to account for it.

Mr. WOLVERTON. You could not conceive of any weather conditions or conditions of atmosphere that would have brought about that failure upon the part of one to see what was so observable to the other?

Mr. BECKWORTH. Mr. Douglas, did you have anything you wanted to say there?

Mr. DOUGLAS. The structure of the aircraft itself must be considered which would limit the view of one pilot and not the other, depending upon how the aircraft is placed with respect to the lights. Take the cockpit where you can see downward only about 10° where the structure of the aircraft has the greatest slope forward. If the

plane were to one side of the lights, say to the left, consider that. The pilot on the right-hand side might very easily see the lights where the pilot on the left would have to look over the structure and his angle of view downward would not be sufficiently great with prevailing visibility so that he could see the ground.

If we take 500 feet as the distance a pilot needs to locate a light, through a space of 500 feet on the ground, then compute on the basis of 10° what visibility he would need for various elevations in order to have a light in view for a distance of 500 feet. You will find that these computations I have are unchecked yet, but a pilot at 300 feet would need approximately 2,200 feet visibility to see a space of light 500 feet long at the minimum restriction of 10° down. If the lights were off to the side, he might need only a thousand or 500 feet visibility to see the same amount of light.

That is one of the factors that needs to be considered in this problem of visibility, what the airplane itself does to what the pilot can see.

Mr. BECKWORTH. Mr. Gates, did you have something to say?

Mr. GATES. I am Robert Gates, of the Civil Aeronautics Administration, in the T–4 building, here in Washington.

There is another possible reason for that occurring which I would like to bring out. That is it is good safety practice for one pilot on instrument conditions to fly his instruments and for the other pilot to be on the watch. In a condition which you have in many approaches the pilot who was watching will see the lights and he will sing out, but the pilot who is flying, by the time he looks up they will be back in scud. So he goes back to his instruments because you cannot fly them without being on them. The person on the right might, by the time he goes back, see the lights again. That could go on back and forth and in and out of scud conditions which is a low scattered cloud.

Mr. HINSHAW. Which I take it is very hazardous to a fellow flying on instruments. He should not look away from his instruments until he is ready to land.

Mr. GATES. When your copilot sings out this contact and you are close to the ground, it is advisable to go contact as soon as possible so you will have to line up. The seconds are very short in that interval. If you do not go contact when you can, you have a missed approach. So it is desirable to go contact when your copilot indicates you are. That is natural.

Mr. HINSHAW. You are in the contact immediately and the thing to do is to pull up and go around?

Mr. GATES. That is correct.

Mr. HINSHAW. Especially when you do not have a glide path?

Mr. GATES. Even so you do not descend below the minimums with or without a glide path.

Mr. HINSHAW. But you do not have a glide path in the first instance, so you are descending on an unknown glide path estimating the distance?

Mr. GATES. That is correct.

Mr. HINSHAW. At least the last time you looked at the instrument if the glide path needles show you were on it, you would have a good idea as to where it would work. If you had no glide path instrument, you would not know.

Mr. GATES. That is right. You would have your altimeter which you use if you do not have a glide path.

Mr. HINSHAW. Some other time we will talk about altimeters and the idiosyncrasies of same.

Mr. WOLVERTON. I do not wish to go further into that situation that I spoke of, Mr. Chairman. I merely wanted, from the standpoint of the hearing today which was in respect to weather, to know whether these gentlemen who are so versed in weather conditions could give any explanation of why one pilot observing the lights and the other one sitting alongside was not able to do so. I suppose that could be the subject of a further hearing and when we have the opportunity of examining the two pilots we may find out about that.

Mr. BECKWORTH. Now we will hear from Mr. A. L. Lewis of the Airborne Equipments Division, Office of Assistant Chief for Research and Development, Department of Navy. Mr. Lewis.

STATEMENT OF A. L. LEWIS, AIRBORNE EQUIPMENTS DIVISION, OFFICE OF ASSISTANT CHIEF FOR RESEARCH AND DEVELOPMENT, DEPARTMENT OF THE NAVY, WASHINGTON, D. C.

Mr. BECKWORTH. Mr. Lewis, would you have any general comments to make apropos of what has been asked and said?

Mr. LEWIS. No, I believe not, sir. I think you have heard the experts on the various aspects of the subject. My job is sort of a cross between an engineer and an applied physicist and administrator, which is to try to decide what is required 6 months from now or 10 years from now by the Bureau of Aeronautics, to try to determine which of these experts can provide the necessary information on that, and try to see that the information is put to Navy use.

Mr. HINSHAW. Being in the Airborne Division of all of this, I wonder if there are any airborne instruments which have been devised that have come to your notice that would permit the pilot in the cockpit to receive the proper answer as to forward visibility upon landing, or whether he must necessarily rely upon surface information?

Mr. LEWIS. I am sorry to say, Mr. Hinshaw, that I have no knowledge of that type of instrument. You might say I am merely in the Airborne Equipments Division for administrative purposes. There is no particular place in the research and development group for administering the type of ground equipment on which I work. We tell the other boys in the Airborne Equipments Division we are the only ones who have our feet on the ground.

Mr. O'HARA. There are certainly still some things unsolved. When we get into the jet operations, it is going to be magnified. The landing speed of your jet operations is going to be that much more difficult, or do the jets land as slowly as a DC–6 or a Constellation?

Mr. LEWIS. I am not qualified to answer that question. My impression is that their landing speed is a little higher. I think Commander Brown could give a better answer to that. He is a pilot.

Mr. HINSHAW. How about that, Commander Brown of the Navy?

Commander BROWN. It is true that the jets do approach at higher speed. That naturally complicates this problem of landing in bad visibility because of the fact that he has less time in which to make his decision as to whether or not he is going to land or wave off.

Mr. O'HARA. He is not going to have any reversible propellers to help him, either.

Commander BROWN. Not on the jets.

Mr. BECKWORTH. Commander, will you identify yourself and the position that you hold in the Navy?

Commander BROWN. I am Lieutenant Commander Brown of the Airborne Division, Bureau of Aeronautics, Navy Department.

Mr. BECKWORTH. As I understand, your function in part would be to determine, after they have prepared these instruments, the practicability for naval use of them, Mr. Lewis?

Mr. LEWIS. Yes. After the work has been done.

Mr. BECKWORTH. But you would not be working on any instrument yourself?

Mr. LEWIS. No.

Mr. BECKWORTH. Just trying to perfect it in such a way that it could be used for the Navy?

Mr. LEWIS. No. If we can we try to anticipate the requirement.

Mr. BECKWORTH. You might know about a given instrument that has possible application and do what you can to get it modified in such a way that it would fit the Navy's use or need?

Mr. LEWIS. That is right, or we might anticipate a requirement and go to one of these laboratories and ask them "Can you develop an instrument of this kind? If you can, then we will transfer the funds and direct that work be done."

Mr. BECKWORTH. In that connection you have anticipated some requirements along the line we are talking. If you transfer any funds, would it be to a man like Dr. Stewart?

Mr. LEWIS. We have not in our office transferred funds to Dr. Stewart. We have been in communication with the Airology Branch of our Bureau which has sponsored that project. In other words, we keep those things pretty well coordinated amongst ourselves. Our branch supported Mr. Douglas' work. The thought behind that was this: We have had a great deal of difficulty with pilots coming in and complaining of runway lights or approach lights being entirely too bright. That is just the reverse of some of the things which you are speaking about. That is almost as bad as not having any lights at all, in some instances, particularly if approach lights are very bright and your runways are very dim. You may come in and he goes right out of the bright lights and he is completely blind, you might say. He cannot see the runways, which is a very dangerous condition.

Mr. O'HARA. That is a good deal like our own experience in driving cars, is it not?

Mr. LEWIS. Exactly.

So having that problem arise and knowing that there was a possibility of a development of a transmissometer or something of that kind, we went to Mr. Douglas and asked him if he would develop a system or a device that would automatically control the brightness on the runway and the approach lights so that as the pilot came in on his approach and down to the landing he would have his lights automatically set at the proper brightness so he would not be blinded and yet he would be able to see clearly.

We also use a transmissometer. Of course, in our instrumentation, for instance at Arcata which has been spoken of here several times, the instrument was necessary for our work.

Mr. O'HARA. Is the Navy still doing considerable experimental work at Patuxent on some of these problems? I am speaking generally of air problems. I think you did some originally on runway lights.

Mr. LEWIS. We did. As Mr. Douglas told you, there are some transmissometers operating down there at the present time and a field test of this automatic control of the brightness by means of a transmissometer is now in progress.

I might say that the engineers, my opposite, in the Air Force, in the Civil Aeronautics Administration—we get together about every other month and discuss these problems, decide as nearly as we can which of them need to be done and who is best equipped to pursue certain of them. We all have more than we can do, so we try to divide them up that way and pass the information around. It is coordinated particularly with the Canadians, the British, and the French.

Mr. BECKWORTH. Mr. Wolverton, do you have any questions?

Mr. WOLVERTON. No.

Mr. BECKWORTH. I assume that you probably have no additional statement to make since you are identified with the same division as he is, Commander Brown, and you have been asked a question.

Commander BROWN. That is correct.

Mr. BECKWORTH. Would either of you have any questions to ask of the commander here? If not, thank you very much, Mr. Lewis.

Mr. LEWIS. I would make this statement: That these are personal views and not official Navy views.

Mr. BECKWORTH. Mr. B. B. Clark, of Eastern Airlines, Inc., Newark Municipal Airport, Newark, N. J.

Is Mr. Clark here?

Mr. Stockburger had his name down.

Mr. STOCKBURGER. They were trying to get him here. He was in New Jersey. They were not certain he could make it.

Mr. BECKWORTH. The final division of the Government is listed as the Civil Aeronautics Administration. Mr. Gates, you are the representative, I believe.

STATEMENT OF ROBERT F. GATES, SPECIAL OPERATIONS BRANCH, AVIATION SAFETY, CIVIL AERONAUTICS ADMINISTRATION

Mr. BECKWORTH. Do you have any general statement you would like to make incident to some of the questions that have been asked?

Mr. GATES. I would like to say we have realized in aviation safety that the problem of recording accurate visibility at the approach end of the runway and in use is one of our most important problems, one which we hope a solution can be worked out for.

Of course, you have the problem of visibility in the approach from the direction in which the aircraft is coming in, and also the runway visibility which enters into the picture, due to blowing snow or blowing sand and fog conditions. I am sure I can recall one accident where the pilot made a perfectly normal contact approach yet crashed and the aircraft burned because of ground fog. That was on the runway. So you have both factors which you must deal with. You might make an approach and yet you might not be able to land on the runway. That is another problem.

We in the Civil Aeronautics Administration appointed a committee to study the low visibility problem and I was named chairman recently. We have not done much work, but our objectives are to study the over-all problem of low visibility. I want to make the statement that the problem associated with the landing involves the airborne equipment and ground equipment, runway lights, runway markings. It is a big problem and you have to consider all of those different factors before you ever reach any solution to this.

Mr. HINSHAW. How urgent do you figure that this matter is, Mr. Gates? It is all very well to talk about 5 years and 10 years in relation to programs, but if it is an urgent matter it is quite possible that constructive steps can be taken to bring about its early solution. It is obvious that there are attempts being made to speed up the landings at airports in order that they may accommodate as much traffic in periods of low ceiling and visibility as they will under normal VFR conditions. There is a continual striving to lower the limits of ceiling visibility which will permit more nearly 100 percent operation at airports; thereby not only accommodating passengers but improving the conditions of the carriers involved at that airport or any specific airport.

If these things are essential, if they are important both from the standpoint of safety as well as economics, but particularly safety, then are we moving as fast as we can or as fast as we might move? Should some constructive steps be taken to increase the speed at which we are moving?

Mr. GATES. The ultimate solution of this problem is the means by which you can land regardless of visibility. In other words, all-weather operation. I just wanted to make that statement at this time. Visibility would not be as important as it is today when you must go from instrument to a contact period prior to touching down. That would eliminate the problem to a great degree if we had the automatic approach which would even permit touchdowns. There have been considerable things done to develop that at Indianapolis and we call it the automatic coupler.

Mr. HINSHAW. However, you have not yet been able to curve a glide path to permit of a reasonably soft landing.

Mr. GATES. They have experimented with the flared glide path. I know there was one in operation. I am not in position to make a statement as to its reliability, though.

Mr. HINSHAW. Have you been able to control the run-out of the airplane?

Mr. GATES. The flareout?

Mr. HINSHAW. The run-out after it is touched down.

Mr. GATES. Well, of course you get on wet runways and icy runways and you have a definite problem. If too much speed is carried on the approach and at contact, the chances are even though the airplane does contact the ground within a reasonable distance, it will not be able to stop. That is a problem which we are working on.

Mr. HINSHAW. Before you get into too much absolutely blind touchdown, you better be sure you can run the airplane out and stop it. That is another problem that is coordinated with it.

Mr. GATES. We have a safety factor which takes care of that. We limit the usability of the runway into what we call the T category regulations.

Mr. HINSHAW. I don't know what they are.

Mr. GATES. I cannot plan on using more than 60 percent of the runway considering all factors. You can use 70 percent for an alternate.

Mr. HINSHAW. If you cannot see the runway and you have no definite control over the direction of the airplane after the touchdown, you had better not touch it down.

Mr. GATES. That is certainly true. However, you get into a position where you have ground fog or blowing sand or snow but you have good visibility just before flaring out. You get into a restricted visibility and the aircraft is stalled out and it damages a strut or ruptures a fuel tank and you have the aircraft burn. That is why I mentioned before that runway visibility is also a very important thing to determine.

Mr. HINSHAW. In the meantime there is a large amount of aircraft that probably will never be equipped with this fully automatic equipment you are talking about. That being applicable principally to the aircraft of high weight and hence high value, or vice versa, which naturally are considered as commercial aircraft and as heavy military aircraft. But the light aircraft does not carry the instrumentation.

Mr. GATES. That is correct.

Mr. HINSHAW. And never will in all probability as the price of aircraft necessarily decreases on to the very small type. Consequently, the problem of visibility is going to be persistent, in spite of the fact you may develop the other one 100 percent.

Mr. GATES. That is correct.

Mr. HINSHAW. This question of visibility, how urgent is it, and what could be done to speed it up if conditions were right to permit it?

Mr. GATES. Well, of course, we feel it is very urgent.

Mr. HINSHAW. What more is needed in the line of supplying instruments or devising instruments? Is the question of funds involved? Is it something which members of this subcommittee and of the full committee might be of assistance in? Is it desirable they should be of assistance? We are looking for an answer as to what we should do about it.

Mr. GATES. I am not qualified to make that statement at this time because this committee has just recently been appointed.

Mr. HINSHAW. The committee of which you are chairman.

Mr. GATES. That is correct. We have to study the work that is being done in that field. From what I have heard here I believe that means are within reach to possibly develop some instrument which would give you more accurate visibility. As to the accuracy of it, I think it is always going to be a problem because of weather. To determine the visibility, for instance, we commit cross-wind landings. If your visibility instrument is out here, the wind is going to bring weather from another direction. That brings up the idea maybe the measuring equipment should be able to swing around to record the visibility in the direction from which the wind is blowing.

Mr. HINSHAW. Obviously there are no considerable numbers of aircraft that are as yet equipped with cross-wind landing and in all probability it will be some time before any standard model will be designed and built by a manufacturer that will come already equipped with such equipment.

Mr. GATES. That is correct.

Mr. HINSHAW. I am talking about a given problem that exists today and whether we should sit and wait for 5 years for somebody to

make up their mind as to what to do about it, or should we attempt to do something about it within 6 months and make some progress toward that that could be usable in the most hazardous situations that are found in the United States?

I am a little sick of problems which run continuously for 5 or 10 years and in an interval of once every 2 or 3 months taking a look at them. Somebody ought to do something. Let us do it now. Let us not wait to find out what somebody think about it 2 months from now.

That reminds me of this Arcata project which went along for years and years. In the meantime nobody could make up their mind what to do. That is one reason why it was shut off, because they had thought it had gone long enough.

What can we do to do something about this that is intelligent and not excessively expensive for the locations where they are needed today and do it in a short time?

Mr. GATES. I certainly agree with your opinion that we should develop it as soon as possible. It is a highly technical development.

As I stated before, from what I have heard it seems that this instrument could be perfected within a reasonably short time if the funds were made available. It would cost a lot of money. I could not state as to when I think it could be done. I think other people in the room would be more qualified to give you an opinion as to when a slope-line instrument could be made. I think that is the ideal instrument. Slope-line and runway visibility are the two factors concerned.

Mr. HINSHAW. I have seen the time when agencies of the Government said, "We have to have an instrument that will do thus and so," and turn the problem over to a manufacturer and say, "You give it to us." Inside of 4 months he would come back with the instrument. That does not mean that you go through somebody's laboratory and wait for 5 years for a bunch of fellows to make up their minds. You tell him your problem. He solves it and hands it back. If you do not like it you do not have to accept it, except to pay his bill. You do not have to use it as a standard thing.

I think we can find the answer to some of these things if we will put them out in the proper places and have them done. I just wondered whether the urgency of this problem was considered to be of sufficient greatness in comparison with other urgencies that are in the Air Safety Division of the Civil Aeronautics Administration to give it some boost and get it going.

Mr. GATES. I personally agree that it is of sufficient importance to merit that attention.

Mr. HINSHAW. That is all, Mr. Chairman.

Mr. O'HARA. What do you think would be required in the way of funds? I am not saying that with any parsimonious approach on these problems, but we are going to have a Congress that is going to be economically minded in the present session. I want to say that I think some of the actions of Congress have been penny-wise and pound-foolish sometimes on some of these things.

Do you feel you are in any position to make any comments as to what would be required in the way of an appropriation, or is it a matter of these scientists getting together and working on something?

Mr. BECKWORTH. Could I enlarge that a little bit by inquiring along this line: As I recall, we have quite a huge Army and Navy appropriation bill. I have always had the idea that the Civil Aeronautics

Administration, the Army, the Navy, and the Air Force cooperate to some extent. I wonder if any of that big money we are appropriating is being spent on some of these problems we are talking about. If so, about how much? I think that might be a good question that we could get an answer to. It would be interesting.

Would you try to help us find out something about that? True, it would be something that the Army, the Air Corps, and the Navy would have to answer together. Could you help us, Commander Brown?

Commander BROWN. That is entirely without my jurisdiction.

Mr. HINSHAW. This is ground instruments.

Mr. BECKWORTH. I am talking about the things we have talked about this afternoon. I mean the things that would solve this problem.

Mr. O'HARA. It certainly is a joint problem of Army Air, Naval Air, and Civil Air.

Mr. BECKWORTH. It is a problem of aviation. It pertains to civil and military and naval very definitely.

Mr. WOLVERTON. In that connection I would also like to know in addition to those agencies that you have mentioned whether the air companies themselves are doing anything along this line? Whether there is any coordination?

Mr. GATES. This committee is within the Civil Aeronautics Administration, but we are to study and coordinate the findings of the different agencies that are working on this problem. As I stated before, we are looking at the whole problem. Visibility is one of the points.

Mr. BECKWORTH. Back to what time are you talking about? Would you try to help us get at that problem? I realize it cannot be answered immediately, but it might be interesting to find out what is being done along the lines we have talked about this afternoon by all those interested in aviation.

Mr. O'HARA. My point, Mr. Gates, is this: I am not going to quarrel with some duplication. I realize on these scientific things sometimes it is advisable to have coordination of it and sometimes it has to be worked out separately. It seemed to me with these functions in government and all the money that is being spent, and let us say all of it wisely, that we ought to be able to get something done soon and see whether or not these instruments are going to work. I am inclined to be critical, as Mr. Hinshaw is, of some of these problems which have been in our laps for a long time. Maybe they have no solution, but I still think there is enough American ingenuity to partly solve them if we go at it. Don't you feel that way?

Mr. GATES. Yes. I wish I could give you some more direct answers to your questions as to when it can be developed and how much it would cost. We will attempt to find that out for you.

Mr. O'HARA. In your work is there some definite coordination in your capacity or in the capacity of your Department in regard to the work of these various departments of the Government? I realize they cannot turn out something in 24 hours, but if they actually got down to work and spent a lot of time on it for 6 months, they would be able to accomplish a lot.

Mr. GATES. That is coordinated to a great extent in the Air Navigation and Development Board and the committees working under that.

We are discussing their problem. When I say I will attempt to find out, actually it should be the job for that Board.

Mr. BECKWORTH. Who is the head of that?

Mr. GATES. They are without a Chairman at the present time. I believe the Chairman resigned.

Mr. WOLVERTON. Does that Board, in the fulfillment of its duties, fix a priority list as to the particular matters that should be given consideration?

Mr. GATES. Yes, sir. For instance, one current problem is the terrain warning indicator which they want to develop.

Mr. HINSHAW. Mr. Chairman, if I have one criticism of the operation of our gigantic bureaucracy in the United States it is a tendency to assign problems to a committee which assigns them in turn to a subcommittee, which in turn assigns them to another subcommittee, and eventually nobody knows where it is.

If this thing is something of sufficient urgency that we ought to do something about it, then it ought to be under somebody's thumb who is directly responsible for the development in coordination with the other agencies, and it ought not to be permitted to get out into the subcommittee field so that it is completely lost. I have known of things that have been presented in some of these committees and subcommittees and through the Air Navigation Board, and a year later they say, "We are hoping to get around to that."

Mr. BECKWORTH. Would you state the name of the Board again?

Mr. GATES. The Air Navigation Development Board.

Mr. BECKWORTH. Mr. Stockburger, if you can get in touch with that Board, see what possible information we might elicit. Maybe we will have some of them up here to testify before us.

Do you have any additional statements?

Mr. GATES. No.

Mr. BECKWORTH. Are there any other questions? Mr. Tipton, it is my thought, because there are several here that may want to be heard and because we may desire to get other people in, that we ought to adjourn at this time. It is getting late, and we would undertake to come back very soon.

Mr. TIPTON. That was all I was going to talk about, Mr. Beckworth. Mr. Wolverton raised a question about what the position of the airline companies was on that. I wanted to undertake to have somebody here to discuss that.

Mr. BECKWORTH. We would like you to do that. I think the course we pursued this afternoon is one that does have unusually great bearing on the current safety and future safety, and is perhaps important for the future, if not more so than for the present. I can conceive it to be this committee's responsibility at least to find out what is going on, how much is being done. If not enough is being done, to do what it can to see that an ample amount is done in time to insure the greatest possible safety.

At this point I will submit this statement for the record.

(The statement is as follows:)

STATEMENT OF THE PROBLEM OF LANDING PROCEDURES UNDER LOW CEILING AND LOW VISIBILITY CONDITIONS

The problem of landing an aircraft under very low ceiling and visibility conditions may be separated into three components: Ground approach control, meteorological advices, and piloting. The three become completely integrated during

the final phases of an approach for landing. Under conditions of higher operating minimums, each of these three components operated more or less independently. The ground control separated the aircraft from other aircraft. The meteorological section observed and reported existing weather from fixed points and gave forecasts of future weather, and the pilot to a large degree used his own judgment in deciding on the procedures he would follow in making the approach and landing. The point at which the pilot could change his mind was at such an altitude that effective passover procedures could be initiated and another attempt could be made if he did not have visual contact at his minimum altitude. With the lowering of the minimums to 200 feet or lower, the pilot may not always be able to successfully change his course of action. It is, therefore, necessary to decide at some higher altitude whether or not a touchdown will be made. This means that the pilot must know for certain whether he will have sufficient visibility to establish vertical and lateral guidance in time to make final corrections to his approach before landing. He is not interested in what the weather was 15 minutes ago or even 1 minute before he reaches the runway but he would like to know what conditions will be present when he arrives at break-out and at touchdown.

Under certain variable weather conditions it may be necessary for the controller to work closely with the meteorologist to determine the effective time for beginning an approach. This may not always be at the time when the weather is most favorable but may take account of fluctuating conditions so that the approach may be started when the ceiling or visibility is very low but by the time the pilot arrives at touchdown the fluctuation would have caused an increase in the ceiling and visibility to the point where a successful landing may be made.

The problem can no longer be separated into three individual pigeonholes where it may be expected to be solved independently by the pilot, the controller, or the meteorologist. It is important that it be considered as a unified and comprehensive problem of great complexity. The solution will depend upon how well the three independent components can be molded together.

The objective of the meteorologist should be to provide the pilot and the ground controller with information of future and/or current conditions pertinent to their respective problems. From the viewpoint of the pilot it is necessary to know whether visual contact can be established at or before critical height and safely maintained at all stages from critical height through break-out, touchdown, and end of roll. In each stage, the slant angle, cone of vision, background, available objects, attendant conditions and pilot's immediate functional activity (orientation, longitudinal position control, glide path control, touchdown, and roll) is different. From the viewpoint of the ground controller, the acceptance rates of the airport for runways in use and time-space minimum separations necessary for safe operation on each runway are necessary.

Visual contact to the pilot means detecting and finally recognizing objects or lights against their existent backgrounds under existent atmospheric and illumination conditions. The view is slantwise in various directions and the background is often terrestrial, not simply horizon as often assumed in theory since the field work of Koschmieder (1924). Motion of the aircraft relative to the objects, background, and possibly cloud or precipitation particles affects the thresholds of detection and recognition. Thus the problem from the pilot's viewpoint is far from as simple as usually assumed by the meteorologist.

A realistic appraisal of the various problems encountered in this view of the subject indicates a need to determine what elements must be observed and forecast, and to develop instruments and techniques for observing these elements and synthesizing the results in terms of forecasts so that they will fulfill the operational requirements of all concerned.

It is suggested that a committee be constituted of meteorologists, pilots, and air-traffic controllers to study these problems and to recommend a workable, integrated plan to achieve with reasonable economy the objectives outlined above for safe landing operations under low ceiling and visibility conditions.

Some of the problems which the committee should deal with are listed below:

(1) Determination of the minimum altitudes at which an "overshoot" may be successfully accomplished in different types of aircraft, under various conditions of wind, weather, and terrain.

(2) Determination of the minimum distances in advance of touchdown point on the glide path which a pilot must have available in order to make lateral corrections of 100, 200, 300, 400, or 500 feet under various conditions of wind, weather, and terrain, taking space and time variations of meteorological elements into account.

(3) Determination of the visibility requirements of the pilot and the copilot separately for daytime and nighttime prior to and during various stages of the approach and landing operations.

(4) Determination of how slant visibility data pertinent to these operations for successive positions on and near the glide path may be ascertained from the ground and forecast for the time of arrival of the aircraft at these positions.

(5) Determination of what information is required regarding cloud height, and of how the information is to be used in conjunction with available visibility data to best fulfill the pilot's and the air traffic controller's requirements.

(6) Determination of the solid geometry of the pilot's and the copilot's cones of vision during flight along the glide path in various types of aircraft.

(7) Determination of how information derived on the ground can best be made available to the pilot during his flight.

(8) Determination of the practicability of a fixed overshoot procedure being worked out by the pilot, the meteorologist, and the air-traffic controller.

(9) Determination of just where, in the approach pattern, is the most effective place to pass meteorological information to the pilot.

(10) Determination of whether pilot's observations of vertical visibility before break-out can be of assistance in ascertaining the slant visability at various points on the glide path.

(11) A study of visual landing aids such as lights, runway markings, etc., under various weather conditions, including fog, rain, and snow.

L. P. HARRISON.
B. C. HAYNES.

Mr. BECKWORTH. The committee is adjourned.

(Whereupon, at 4:30 p. m., Tuesday, February 5, 1952, the hearing was closed, subject to call.)

AVIATION SAFETY

THURSDAY, FEBRUARY 14, 1952

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE OF THE COMMITTEE ON
INTERSTATE AND FOREIGN COMMERCE,
Washington, D. C.

The subcommittee met, pursuant to call, at 2:15 p. m., in room 1334, New House Office Building, Hon. Lindley Beckworth (chairman of the subcommittee) presiding.

Mr. BECKWORTH. The committee will come to order.

The purpose of the hearing today is to try to get some information with reference to the question of airworthiness, parts 3 and 4. The committee, naturally, feels it is important for this committee to know something about the procedures by which the different types of planes are passed on, in order to determine whether or not they are airworthy.

The first witness we shall have is Mr. John M. Chamberlain.

Realizing that this is a rather technical phase of our hearings, and realizing further that some of the witnesses who will appear before us may desire to correct that which they say and may desire to add to some of the testimony they give later, based on further inquiry they make, we have felt it is a good thing to give them that privilege.

Mr. Chamberlain, will you come forward and make any general statement you might care to make with reference to parts 3 and 4, emphasizing particularly the history of this question of airworthiness?

STATEMENTS OF JOHN M. CHAMBERLAIN, DIRECTOR, BUREAU OF SAFETY REGULATION; EMORY T. NUNNELEY, JR., GENERAL COUNSEL, CIVIL AERONAUTICS BOARD; AND E. S. HENSLEY, DIRECTOR, OFFICE OF AVIATION SAFETY, CIVIL AERONAUTICS ADMINISTRATION

Mr. CHAMBERLAIN. Mr. Chairman, I have not come prepared with any general statement; but I think, in response to your explanation, I can give a brief history of the two parts of the regulations to which you refer, parts 3 and 4, and can be prepared to answer any further questions the committee wishes.

I will go back into history a little bit for illustrative purposes. The original airworthiness regulations promulgated by the Government were known as Bulletin 7–A and were promulgated by the Department of Commerce—the Bureau of Air Commerce, I believe—in the middle and late twenties.

Mr. BECKWORTH. Will you talk just a little louder, please, sir.

Mr. CHAMBERLAIN. Yes. These airworthiness regulations, known as Bulletin 7–A at that time, were very general in the light of today's

airworthiness standards and in the light of today's knowledge of these airworthiness matters.

There was only one set of standards for all types of airplanes, large and small alike. They were not very demanding with respect to performance requirements for airplanes and were not at all similar in scope or specific detail to present airworthiness regulations.

In the latter part of the thirties, these regulations were redrafted in somewhat more comprehensive form, in the form of the Civil Air Regulations. I think they came out in 1937, and the next year the Civil Aeronautics Authority came into being, and all of these regulations were then adopted as Civil Air Regulations of the Civil Aeronautics Authority; and at that time they were in the form of part 4 of the Civil Air Regulations.

Very shortly after that, our experience with larger transport-type airplanes having increased considerably, notably with the DC–3, it was realized that we needed more comprehensive airworthiness requirements with respect to performance, structural, and flight characteristics, for that type of airplane which would be carrying passengers in air-carrier operation, and requirements which would more nearly tailor the operating capabilities of the airplane to the actual requirements of the airports and the routes over which they would be flown.

Prior to that, there had been one maximum weight specified, based on certain rather meager requirements, all at sea level. These new requirements were then developed and, I believe, first introduced into the regulations about 1940, as additional requirements in this part 4 of the airworthiness regulations, applicable to what was then called transport-category airplanes. They specified, as they were ultimately effective, that any new type of airplane which was to be introduced into scheduled air-carrier passenger service after July 1, 1942, must comply with these transport-category requirements.

They further specified a date—I think initially about 3 years after that time—after which all airplanes continuing in scheduled air-carrier passenger service would have to comply with those requirements. That was in the days when we had a maximum of some three-hundred-odd DC–3's, and we didn't anticipate 10,000, or however many more we ended up with as a result of the war and the history with which the committee is familiar.

The transport-category requirements differed in many respects from the requirements theretofore in effect, but I think most significantly for the purposes of this hearing with respect to the capability of the airplane to continue with a take-off if one engine failed at a critical point and to continue flight under any other conditions en route or on landing, with the failure of one engine. They required, incidentally, that airplanes certificated in this transport category be multiengine aircraft. They flatly ruled out the single-engine airplane, and did require a fairly good measure of one-engine-out performance capabilities.

The requirements still remained much more general with respect to airplanes not contemplated for use in scheduled air-carrier passenger service. They were still a part of this part 4, but known as the non-transport-category requirements, or the normal-category requirements more specifically.

In 1945, after considerable more development work by the CAB, the CAA, and the industry, both the manufacturers, the airlines, and others, a further change was made in the basic structure of the airworthiness regulations, and—I think primarily at the express desire of the industry—two separate parts of the airworthiness regulations were created. Part 4, later to be modified as part 4B, remained as the basic body of requirements for transport-category airplanes, or those to be used in scheduled air-carrier passenger operation. A new part, part 3, was created, which incorporated all of the requirements for the nontransport category. It was primarily, I would say, but not solely by any means, intended for the smaller type of airplane, the personal type of airplane. It obviously was not limited to small airplanes, however, because some of the requirements indicated weights up to 50,000 pounds, and so forth.

However, it was not anticipated, I think it is fair to say, that there would likely be new types of airplanes in that higher-weight class, which would not comply with the transport category requirements and so be fully eligible for scheduled air-carrier passenger service.

I might pause at this point and see whether I have made the picture relatively clear as far as I have gone and see if you wish to direct questions.

Mr. HINSHAW. May I ask a question or two, Mr. Chairman?

Mr. BECKWORTH. Go ahead.

Mr. HINSHAW. In connection with these regulations, which you say were commenced in 1937 as alterations of the old category 7–A under the Commerce Department, you have mentioned that the availability of runways in sufficient length, and a number of other subjects, were part of the considerations.

I wonder if you could go into a little further detail and explain to us what the runways and runway lengths and altitudes had to do with the subject of airworthiness, just for our information.

Mr. CHAMBERLAIN. I will be glad to attempt to do that in a general sort of way.

I think I might find myself a little over my depth if I attempt to get too precise, and I think there are qualified engineers here from both CAA and the Board who might be able to go into that a little more precisely if the committee wishes. I can cover it in a general sort of way.

Mr. HINSHAW. Mr. Chairman, if Mr. Chamberlain has somebody here either from the CAB or from the CAA who he would like to call on to answer any of these questions, he would be perfectly free to do so, I assume?

Mr. BECKWORTH. That is right. If there is anything you want to check with some person back there, feel free to do so.

Mr. CHAMBERLAIN. Do you wish me to do that at this time?

Mr. HINSHAW. I think we should clear up the situation as much as we can as we go along.

Mr. BECKWORTH. Make any statement you care to in brief; and then, if you feel someone else can add to that, you can suggest his name, and we would be glad to hear him.

Mr. CHAMBERLAIN. All right.

Let me explain, in connection with this particular point, with respect to runway lengths and altitudes and so forth, that the regula-

tions really consist of two basic parts: One, the basic airworthiness requirements, to which I have referred thus far, the requirements which require a certain minimum performance, minimum capabilities of the airplane, and minimum structural requirements, in order to have it certified as basically airworthy; then, in the other parts of the regulations, the so-called operating parts, the ones which apply to the operations of the scheduled air carriers on the one hand, both domestic and international, and the irregular air carriers more recently, there are operating rules which have to do with the adjustment of weights in the operation of these airplanes in accordance with the runway lengths and the terrain over which they must fly.

I think it may be in the area of these operating requirements that the committee is particularly concerned in this last question.

What the requirements do basically is to determine the performance capabilities, under most all conceivable conditions, and then provide data whereby the operators can adjust the weights in such a manner that they have relatively the same margins of performance, regardless of the length of runway or the obstructions in the take-off path immediately after take-off, and the clearance over terrain en route.

I don't know whether I make myself clear or not. But the weight must be adjusted to suit the actual conditions that the airplane is going to encounter. In other words, if the airplane has a runway of infinite length, and there are no obstructions off the end of it, and all other things are equal, the airplane may take off at its highest certificated airworthiness weight. If the runway is correspondingly shorter, or if there are obstructions in the path, or if the terrain over which it must fly to reach its destination is sufficiently high, the weight must be reduced to a point where it will provide essentially the same margin of performance capabilities. That is the very general statement that, I think, gives the theme of the transport-category requirements compared to the old requirements which provided simply that they be able to take off at the maximum weight in a stated length of runway, with no further regard given to the actual operating conditions that the airplane would encounter.

Mr. HINSHAW. Does that mean that each runway has a maximum take-off weight for a given type of airplane?

Mr. CHAMBERLAIN. It probably does, depending on whether or not it is short enough to come within the critical range.

Mr. HINSHAW. And that different runways at different altitudes above sea level likewise have different take-off weights; is that correct?

Mr. CHAMBERLAIN. That is correct. The same length runway at Washington and at Denver, for example, would probably have different weights. Assuming that the runway at Washington were critical, or were just long enough to permit the airplane to take off at its maximum weight, that same length runway at Denver would require a reduction in weight.

Mr. BECKWORTH. You mentioned scheduled carriers. I assume definitely as nonscheduled came along you applied the same standards to them.

Mr. CHAMBERLAIN. Not as of the moment, sir. With respect to the airplanes that they are presently operating, no; that is not the case.

Mr. BECKWORTH. Would you distinguish between the type of air-

worthiness requirements that you have called for in the case of scheduled carriers and in the case of nonscheduled carriers?

Mr. CHAMBERLAIN. Yes; I can do that.

Mr. Chairman, I might mention that I have a statement, which was sent as the answer to one specific question that was asked of the Board within recent weeks by the Senate committee, that involves this same general problem; and I think it would cover this relationship between these requirements for the scheduled and irregular carriers.

Mr. BECKWORTH. You would wish to put that, probably, in the record?

Mr. CHAMBERLAIN. If you wish, I can include that in the record. I can either read from it or brief it in my testimony.

Mr. BECKWORTH. Without objection, we will include it in the record; and, if you can discuss it briefly, that probably would be just as good as reading it. It will certainly give us the salient points.

Mr. CHAMBERLAIN. All right, sir.

(The material referred to is as follows:)

CERTIFICATION BASIS OF THE C–46

The following outlines briefly the history of the safety regulations as they apply, first, to aircraft used in scheduled air-carrier service and, second, to aircraft used in irregular air-carrier service.

Airplanes introduced into scheduled air-carrier passenger service in the 1930's, notably the Douglas DC–3 and Lockheed Lodestar, were certificated under airworthiness requirements of the Department of Commerce, known as Bulletin 7–A. These regulations, which in 1937 became part of the Civil Air Regulations of the Department of Commerce and within the following year the Civil Air Regulations of the Civil Aeronautics Authority, were very general and undemanding by today's airworthiness standards. They prescribed performance standards, for example, which varied only slightly in their application to small personal-type airplanes or to large transport-type airplanes. Shortly after this time a new set of airworthiness requirements was developed which was finally introduced into the regulations in 1940. These requirements were known as the transport-category requirements and, as they finally came into effect, applied to all aircraft type certificated on or after July 1, 1942, which were to be used in scheduled air-carrier passenger service. These requirements differed from those theretofore in effect by prescribing, for example, far more comprehensive standards for the performance of transport-type airplanes, particularly in their ability to continue a take-off and continue flight en route with one engine inoperative. They also required an adjustment of the operating weight of an airplane dependent upon the length of the runway available, the field elevation, and minimum safe altitude over high terrain.

At this same time the regulations were also amended to provide, initially, that after December 31, 1945, no airplane should remain in scheduled air-carrier passenger operation unless it complied with the new transport-category requirements. This would have retired from service the DC–3, the Lodestar, and other such airplanes which did not, and could not, without extensive modifications, meet the transport-category requirements. It soon thereafter became obvious that because of the war, which prohibited the construction of the contemplated new transport-type airplanes for air-carrier service, the existing fleet of air-carrier aircraft could not be retired at any such early date as originally contemplated. The date was extended three times in the ensuing years and currently stands at December 31, 1953. However, the Board has published within recent months a notice of proposed rule making to eliminate this terminal date from the regulations and permit airplanes such as the DC–3 and the Lodestar to continue in scheduled passenger service indefinitely so long as it is feasible to operate them and so long as they comply with any amendments to the regulations which are considered essential to apply retroactively in the interest of safety.

With respect to irregular air-carrier operations, since there was no appreciable operation of this character prior to the termination of World War II, no separate body of regulations existed for this type of service. However, during

1945, coincident with the end of the war, it became apparent to the Board that a considerable amount of activity in this field was starting and would be increased as surplus military types of aircraft became available at relatively low prices, and many returning veterans would be interested in continuing their flying careers started during the war as military pilots. Accordingly, a separate group of regulations was developed, circulated for comment, and in early 1946 adopted to become fully effective August 1, 1946. These regulations were known as part 42 of the Civil Air Regulations and prescribed at first rather general requirements compared to the regulations then governing scheduled air carriers. The Board stated, however, with the adoption of this part, that it would follow the development closely and as more experience was gained with this type of operation the regulations undoubtedly would be amplified. The requirements in this part prescribed that the aircraft be certificated as airworthy and that they otherwise be found satisfactory for the service intended by the Administrator of Civil Aeronautics.

During the next 2 years the regulations were amended from time to time as experience was gained by both the Administrator and the Board with this type of operation. In the summer of 1948, the Board, with considerable assistance from the Administrator as a result of his experience with this mushrooming phase of the industry, developed some very comprehensive revisions to the regulations in order to bring them more nearly into line with those governing the scheduled air carriers, since it was then apparent that the operations were being conducted with aircraft and otherwise on a scale comparable to many of the scheduled air carriers. One of the significant elements of this series of amendments was the prescription of operating limitations applicable to irregular air-carrier aircraft in order to achieve substantial uniformity in the operating weights used by the various air carriers with the same type of aircraft, from the same airport, or over the same route, and to require adjustment in weight for variations in airport elevations and runway length. The Board at the time of promulgating these amendments gave serious consideration to the advisability of requiring as of some date in the near future compliance with the transport-category requirements for airplanes already operating in irregular air-carrier passenger service, but it finally concluded that such action could not be justified first, because virtually all of the aircraft then operated by such carriers could not meet the transport-category requirements and thus would be put out of service; and, second, the accident and operating record of these carriers did not point to the aircraft-certification basis as a critical distinction, particularly in view of the operating limitations then being introduced into the regulations.

The Board did, in 1951, amend part 42 to provide that any new type of airplane introduced into irregular air-carrier passenger service after August 1, 1951, must comply with the transport-category requirements.

In summary, the reason why the C–46 has been permitted to be used in irregular air carrier passenger operation and not in scheduled air carrier passenger operation is due to the simple fact that our safety regulations change from year to year, increasing in comprehensiveness and severity in many respects as our technical knowledge and our knowledge gained from practical operating experience increases and it is wholly impracticable to apply our continually changing standards designed for future aircraft types retroactively to existing aircraft since this would result in an almost constant series of modifications. An exception, of course, is that type of safety regulation amendment which is considered of sufficient significance to the increase in air carrier safety, that it justifies the economic burden involved. There are many examples of this through the years, notably, the amendments relative to fire prevention which have been made applicable to all air carrier aircraft scheduled and irregular alike, including, of course, the C–46.

Irregular air-carrier operation as we know it today and the specific regulations governing that operation have both come into being relatively recently and it was not possible without the most serious economic consequences to apply identical standards with respect to the certification basis of aircraft used in this service and those used in scheduled service. The C–46 was certificated under the airworthiness requirements for the normal category in part 3 of the Civil Air Regulations shortly after the war and was eligible to be used in irregular air carrier service since the specific regulations for this type of service were not yet developed, as has previously been explained. The C–46 has also been used and is still being extensively used by the scheduled air carriers, but of course only for cargo operation, since the regulations have prevented its introduction since 1942 into scheduled passenger service.

The Board has been constantly cognizant of the record of the irregular carriers in the past several years and I believe that the record of repeated regulatory activity by the Board and enforcement and other activity by the Administrator are directly indicated by the constantly decreasing accident trend in this type of service. The C–46 airplane particularly has been carefully looked at at different times in the past to see whether or not it was responsible in any identifiable measure for the accident record and until recent months the conclusion has been to the contrary. As you are undoubtedly aware, a very careful examination of the history and capabilities of this type airplane was conducted by the Board and the Administrator some months ago and as a result the Administrator conducted certain performance tests to be used as a basis for determining any posible future action with respect to this type. The Administrator advised the Board that as a result of these tests, it appeared that the C–46 should have the maximum weight somewhat reduced in order to properly comply with the airworthiness requirements under which it had been certificated and that it could comply with the transport category requirements only at such a low weight as to make it totally unusable in air carrier service. Thereupon the Board published a notice of proposed rule making which would have reduced the weights in two specific steps. So much opposition was voiced as a result of this proposal that the Board held a public hearing before an examiner in order to give all parties concerned adequate opportunity to present such facts as they had available on the subject. During the hearing the operators of the C–46 sought to show that there was not sufficient cause on which to base a weight reduction and that the accident record did not justify such action. This rather extensive record has been in the process of examination and it is contemplated that the Board will very soon be able to come to conclusions on this matter and take such action as seems to be justified by the facts available.

Mr. CHAMBERLAIN. I think I have already mentioned the fact that the requirements, the Civil Air Regulations, were amended some years ago to provide that any new type of airplane introduced into scheduled passenger service after July 1, 1942, must meet the transport category requirements. Now, at that time, there was no such thing, to any appreciable degree at least, as irregular air-carrier operation. I think we considered in those days that there were air carriers and then a miscellaneous type of small plane operation. Hence, there were no separate regulations, air worthinesswise or operationswise, which applied to what we now know as irregular operation, prior to the end of the war.

It became apparent to the Board, along about 1945, that there was going to be more of this type of operation, this irregular type of operation, due to the fact that airplanes were becoming available from surplus, and there were many service pilots coming back home who wanted to continue their flying careers, and it involved small airplanes and medium airplanes as well.

The Board took cognizance of this by developing, during 1945, and 1946, and adopting effective August 1, 1946, a new part of the civil air regulations known as part 42, which governed the certification and operation of irregular air carriers.

The Board stated at that time that the requirements were necessarily still very general, because the entire scope of this type of operation was not too well known even at this time. But it indicated in the preamble of that regulation that the Board would follow this closely and undoubtedly change the regulations from time to time as the experience gained with that new type of operation increased.

That very thing did happen, and during the next 2 years the regulations were amended several times to cover specific areas in the regulations that experience showed needed to be covered more fully. The last extensive group of amendments was made, I think, in 1949 and

some very comprehensive changes were made in these regulations, particularly with respect to the maintenance and the operation phases of the regulations. And significantly, I think, some performance operating limitations were imposed, which, for the first time in this type of operation, required these carriers to adjust their weights, not as completely as for the transport categories, but along the same general lines, consistent with en route altitudes and with runway lengths in order to get reasonable uniformity in the operating weights of different carriers using the same type of equipment.

Mr. BECKWORTH. Mr. Chamberlain, so that we might have a general understanding, assume that the nonsched and the general carrier happened to be flying over an identical route occasionally. Would the identical rules and regulations apply to both, or would there be any difference?

Mr. CHAMBERLAIN. There are some differences, if I understand your question correctly, between a scheduled carrier and a nonscheduled carrier.

Mr. BECKWORTH. That is right; where they are flying over the same route from Washington to Denver, Colo., say, and flying a DC–3 plane, what would be the difference in the rules and regulations applicable to the two? Or is there any?

Mr. CHAMBERLAIN. Yes. I was just coming to that point in the discussion.

These performance operating rules that I just referred to, that were put into effect here during this last major revision, actually were somewhat more detailed, and in some respects more severe, with respect to the operating weights of a DC–3, for example, or a C–46 or any nontransport category airplane, than were already in existence for the same types of airplanes operated by the scheduled carriers. There were not great differences, but there were some differences, and, as I say, they were somewhat more severe for the irregular carriers.

Now, I might mention, in connection with that, to keep the thing in proper balance, that the requirements, these operating performance requirements, for the nontransport category airplanes, for the scheduled carriers, that is, those applying to the DC–3, and so forth, have not been changed significantly through the years, because it happens that the DC–3 and the Lodestar, the Lockheed Lodestar, at the weights at which they are presently operating, can meet, at least at sea level, the more stringent performance requirements of the transport category. So there happens to be no significant difference in the actual operating levels there.

Now, the requirements for the scheduled operator and the irregular operator, operating the same airplane over the same route, I would say would achieve essentially the same degree of performance for a particular airplane, and in the cases where it would differ, I think it would be slightly more severe on the irregular air carrier.

Mr. HINSHAW. What about the type of airplane, Mr. Chamberlain?

Mr. CHAMBERLAIN. The significant difference here, I think, is the fact that the C–46, which was in this irregular air carrier operation at the time when, as I mentioned, the Board promulgated separate rules for the irregular air carriers, was certificated not under the transport category requirements but under the normal category requirements of part 3; because the rules thus far had not prevented an air-

plane in that type of service from being certificated under those more general airworthiness rules.

It happens that the C–46 does not have the same performance capabilities at the weights at which it is certificated, under these normal category airworthiness requirements, as the DC–3 and the Lockheed Lodestars. In other words, the airplanes that the scheduled carriers happened to still be using at the time this requirement went into effect, which said any future types must meet the new requirements, happened to have sufficient performance capabilities so that they could continue operating at the present weights and still have performance comparable to that which would be required of them under these transport category requirements.

Mr. HINSHAW. Now, just specifically, what airplanes are you referring to in that statement?

Mr. CHAMBERLAIN. I think for the purposes of this discussion, the only three types we need to refer to are the DC–3, and the Lockheed Lodestar, both of which are used by scheduled carriers in passenger service, because they were both introduced into service back before 1942, and the C–46, which cannot be used by the scheduled carriers, because it was introduced into service after that 1942 date, but which can be used by the irregular carriers.

Mr. HINSHAW. Let us take the C–54, which is also used by the irregular carriers. Is there any significant difference between the operating characteristic requirements of a C–54 in scheduled and nonscheduled operation?

Mr. CHAMBERLAIN. No, there is not. Because the requirements in the irregular field state that if they are using airplanes basically certificated in the transport category, they must operate them in accordance with those requirements.

Mr. HINSHAW. And the C–54, the Lockheed Constellation, the DC–6—I suppose there are two sizes of Constellations, the 649 and the 1049——

Mr. CHAMBERLAIN. And the 0–49.

Mr. HINSHAW. The 0–49 was the first one, and the 649, the 749, and now the 1049.

Mr. CHAMBERLAIN. That is right, sir.

Mr. HINSHAW. And the DC–6 including its B category today, are all operated under the air transport regulations, which is part 4, and they are operated essentially identically by both the scheduled carriers and the nonscheduled carriers that happen to be operating them.

Mr. CHAMBERLAIN. I think that is correct. There is one exception I would like to make. The transport category requirements to which I have been referring have been applicable to passenger operation; not necessarily to cargo operation. But so far as passenger operation by either a scheduled or an irregular carrier is concerned, if the airplane of the types you have just mentioned was certificated as a transport category airplane, it would be operated to the same performance requirements by both carriers.

Mr. HINSHAW. Therefore, that subject so far as those airplanes is concerned, is moot. There is no controversy on those lines. Is that correct?

Mr. CHAMBERLAIN. That is correct.

Mr. HINSHAW. Then the controversy comes entirely with the C–46 and its application with respect to the nonscheduled and the scheduled carriers.

Mr. CHAMBERLAIN. That is entirely correct.

Mr. HINSHAW. Now, is the C–46 used by both types of carriers?

Mr. CHAMBERLAIN. Yes; but by the scheduled carriers only in cargo service.

Mr. HINSHAW. Is it used in any charter service by the scheduled carriers? I think it is.

Mr. CHAMBERLAIN. It can be, yes. It can be if it is not in scheduled passenger service, if it is in charter service or under an irregular carrier certificate. It can then be used by those carriers.

Mr. BECKWORTH. Explain again: Assuming that passengers were being carried in a C–46 from Washington to Dallas, Tex., by a nonscheduled carrier, now, why is it that a scheduled carrier could not use the same plane and carry the same number of passengers to Dallas?

Mr. CHAMBERLAIN. It is merely because of the normal progress in our regulations and in our regulatory thinking. We advanced our airworthiness thinking in 1940 or thereabouts to the point where we said after 1942 we are going to require new type airplanes to have this higher standard of performance. We did not even visualize this irregular type of air carrier service at that time, at least of the magnitude to which it has developed since the war. The regulations had just not been developed for that particular type of service. There was no regulation to prevent the introduction into that type of service in 1945 of this C–46 airplane, which did not comply with the transport category requirements. It is merely the result of the chronology of the development of the whole regulatory scheme and the actual air carrier industry in the last 10 years.

The regulations at the present time—I don't believe I have mentioned this before—do require that any new type airplane introduced into irregular air carrier passenger service after a date back in the middle of 1951, which I don't recall specifically—any airplane introduced newly into irregular air carrier passenger service that was certificated any time after last year must also comply with the transport category requirements.

So we can say with respect to any airplane hereafter introduced into either type of service, scheduled or irregular, passenger service, they would have to meet the same standards.

Mr. HINSHAW. Now, you say "introduced." You mean newly introduced?

Mr. CHAMBERLAIN. Newly introduced.

Mr. HINSHAW. As a new airplane?

Mr. CHAMBERLAIN. As a new type of airplane; yes.

Mr. HINSHAW. So that if some new design came out——

Mr. CHAMBERLAIN. Like a DC–12.

Mr. HINSHAW. Like a DC–12 or Lockheed 15. The requirements would be identical for both types of carrier?

Mr. CHAMBERLAIN. That is correct.

Mr. HINSHAW. Now, where does the Convair come into this picture? At what point?

Mr. CHAMBERLAIN. Well, the Convair came into the picture—I have forgotten the exact year it was certificated, but I think perhaps 1947. It came in after the dead line for scheduled carriers, and it is a transport-category airplane.

Mr. HINSHAW. And the 404 as well?

Mr. CHAMBERLAIN. Yes, sir. Every airplane, starting with the DC–4, I think I am safe in saying. The DC–4, the entire series of the Constellations, the Boeing 377, the Convair 240 and 340, the Martin 202 and 404, all of those are transport-category airplanes.

Mr. HINSHAW. No matter who they are operated by, their operating requirements, are identical?

Mr. CHAMBERLAIN. That is correct, for passenger service. There is some difference between passenger and cargo.

Mr. HINSHAW. We can get into that. But what I am trying to do is to find out how exclusive this problem is that we have to consider, as to the difference in operating requirements for a nonscheduled and a scheduled carrier.

You say it is, practically speaking, entirely in the C–46, which I believe was manufactured by Curtis.

Mr. CHAMBERLAIN. That is correct.

Mr. HINSHAW. Now, when did the C–46 first go into certificated service?

Mr. CHAMBERLAIN. I believe it was originally certificated in 1945.

Mr. HINSHAW. Before the effective date of these regulations, that occurred sometime in 1945?

Mr. CHAMBERLAIN. Yes; it was certificated and actually in service before these regulations went into effect. Actually we started to dwell upon them in 1945. They were promulgated and took effect in August 1946. The C–46 had been certificated and was in such operation prior to the time those regulations went into effect.

Mr. HINSHAW. And you say it was not certificated for scheduled carriers, but only for nonscheduled irregular carriers?

Mr. CHAMBERLAIN. That is correct; for passenger service.

It is significant to say passenger service.

Mr. HINSHAW. It has been certificated for a scheduled carrier's use in cargo service and in charter service?

Mr. CHAMBERLAIN. That is correct. A sizable part of the C–46 fleet is today being used by scheduled carriers in cargo service.

Mr. HINSHAW. Well, now, let us for the time being leave the cargo service out and consider only exclusively the passenger service.

Is there any difference today, or in recent times, between the requirements for the operation of the C–46 in nonscheduled passenger service, regardless of what type of service it may be, and in the use of the same airplane by a scheduled carrier in charter passenger service?

Because you say that is the only place it can be used, in passenger service, by the scheduled carriers.

Mr. CHAMBERLAIN. There is no significant difference, because if a carrier used it in that type of service, he undoubtedly would have to be operating it as an irregular air carrier and so come right back into the same regulations that a larger irregular carrier would use.

Mr. HINSHAW. Well, that doesn't quite jibe with some facts that I have heard, namely, that in bidding on military contracts for the transportation of military personnel, the scheduled carrier, starting in 1946, has had to abide by a different set of regulations than the nonscheduled carrier operating a C–46.

Mr. CHAMBERLAIN. I may have to get some help on that. We are getting into the legal application of the particular rules.

Mr. HINSHAW. Well, if Mr. Nunneley wants to answer the question directly, that would be satisfactory.

Mr. NUNNELEY. My understanding is that in order to operate the C–46 in what we call irregular or off-route operations, by the scheduled carrier, it would do so under an operating certificate issued pursuant to part 42 and in accordance with the rules and requirements of part 42; so that so far as that kind of operation is concerned, the same standards and rules would be applicable.

Mr. HINSHAW. If X airline then owns a C–46 and wants to compete with Y nonscheduled carrier for the transportation of, let us say, military personnel from one military installation to another, there is no difference in their requirements for handling and loading the aircraft?

Mr. NUNNELEY. That is correct. They can obtain an operating certificate under part 42 and operate in accordance with those requirements for that type of operation.

Mr. HINSHAW. Is there any requirement which would permit them, speaking now of the scheduled carriers, to operate a C–46 in the passenger service?

Mr. NUNNELEY. I am sorry. I think I lost your question.

Mr. HINSHAW. Can a C–46 be operated today by a scheduled carrier in scheduled passenger service?

Mr. NUNNELEY. No, sir.

Mr. HINSHAW. Not at all?

Mr. NUNNELEY. No, sir; not in scheduled passenger service.

Mr. HINSHAW. In any way?

Mr. NUNNELEY. No, sir. There is no way that can be accomplished under the regulations.

Mr. HINSHAW. You say there is no way that can be accomplished under the regulations. Why not?

Mr. NUNNELEY. Because the regulations require that scheduled carriers use transport category aircraft if the aircraft was introduced into service after 1942. The C–46 aircraft was introduced after that date.

Mr. HINSHAW. And it cannot meet the transport category?

Mr. NUNNELEY. Well, not at the weights at which it is being operated, nor in fact at any weights which would permit it to be operated economically. It has not been so certificated.

Mr. HINSHAW. Not at any time?

Mr. NUNNELEY. No, sir.

Mr. HINSHAW. Hence, the only place that it could be used today in the passenger service is in the nonscheduled or irregular carriage. Is that correct?

Mr. NUNNELEY. And the off-route services.

Mr. HINSHAW. And the off-route services of the scheduled carriers.

Mr. NUNNELEY. Yes.

Mr. BECKWORTH. Explain that term "off-route."

Mr. NUNNELEY. That is perhaps not wholly accurate. It means the charter or special services of those carriers, as distinguished from their regular scheduled services.

Mr. HINSHAW. Is there any reason other than the economic reason why it could not be certificated for that purpose? That is, for the scheduled passenger service?

Mr. NUNNELEY. I think, sir, if I understand you correctly, there is a specific requirement in the safety regulations, part 40 or 61—I have forgotten which one—which says that in scheduled passenger opera-

tions no plane introduced after July of 1942, if I recall the date correctly, may be used, which is not certificated in accordance with the transport category. This plane is not. Hence it cannot be used in scheduled passenger service under the existing safety regulations.

Mr. HINSHAW. Well, is the reason that it is not certificated because no one has applied for such certificate, or because the plane cannot meet the standards?

Mr. CHAMBERLAIN. Mr. Hinshaw, the fact there is that the airplane cannot meet the standards, the transport category requirements, at a weight which would permit it to operate economically at all.

Mr. HINSHAW. What would be the weight at which it could be certificated?

Mr. CHAMBERLAIN. The CAA has determined on the basis of tests they have conducted recently that it could meet the transport category requirements only at a weight of approximately 36,000 pounds.

Mr. HINSHAW. 36,000?

Mr. CHAMBERLAIN. 36,000.

Mr. HINSHAW. That is gross weight?

Mr. CHAMBERLAIN. That is maximum weight; yes, sir.

Mr. HINSHAW. Including fuel and everything else?

Mr. CHAMBERLAIN. That is right.

Mr. HINSHAW. And what would the net load be?

Mr. CHAMBERLAIN. I think based on the weight of an average C–46, that would permit you to fly for about 4 or 4½ hours with something less than one standard passenger.

Mr. HINSHAW. Something less than one standard passenger weighing 160 pounds, with 40 pounds baggage?

Mr. CHAMBERLAIN. That is right, sir. In other words, it is less than the weight of a passenger, recognizing that the individual weights of airplanes do vary somewhat.

Mr. HINSHAW. Now, why is that? Is that because of the power loading, or the wing loading, or what?

Mr. CHAMBERLAIN. Well, it is because of the climb capabilities in what we call the first and the second segments of the take-off. In other words, as soon as the airplane accelerates to what we call the critical engine failure speed, one engine is assumed to fail, and the pilot elects to continue with the take-off. While the gear, the landing gear, is being retracted, and the propeller is being feathered, it is in its most unfavorable condition so far as climb performance is concerned, and in that configuration, which exists incidentally only a matter of seconds, the airplane does not have the required positive rate of climb with only one engine. That is one of the features, one of the most severe features, I think, of the transport category requirements, in contrast to the other normal category requirements. That one element would reduce the weight several thousand pounds, in order to provide a certain positive rate of climb during those few seconds when the gear is being retracted and before the propeller is feathered.

Mr. HINSHAW. Well, am I correct in the assumption that at the critical point on take-off the airplane is underpowered?

Mr. CHAMBERLAIN. That is one way of saying it, based upon the transport category requirements as a norm.

Mr. HINSHAW. And what is the horsepower rating at climb, or take-off rating, at that point?

Mr. CHAMBERLAIN. The take-off rating of those engines is 2,000 horsepower, I believe.

Mr. HINSHAW. The take-off rating is 2,000 horsepower each?

Mr. CHAMBERLAIN. That's right. Yes, sir.

Mr. HINSHAW. And what would they have to be, if anyone has calculated it, to meet the airworthiness requirements in the transport category for that particular airplane?

Mr. CHAMBERLAIN. I don't know the answer to that. I don't know whether anyone in the room has that, or not. I don't know that it has been computed on that basis. It is just a plain increase in horsepower.

Mr. HINSHAW. Well, I would want just an approximate figure. I would not want to nail anyone down with a specific figure. But if no one has that specific figure in mind, perhaps an approximate figure could be inserted in the record, without any intention of binding the Civil Aeronautics Board to such a figure without complete study and calculation.

Mr. CHAMBERLAIN. All right. We will be glad to determine that as nearly as possible and submit it.

(The information referred to is as follows:)

The take-off rating of the C–46 engines would have to be approximately 2,820 horsepower in order to meet the airworthiness requirements of the transport category at 48,000 pounds.

Mr. MACK. On that same line, Mr. Chamberlain, what is the rate of climb that is required? What rate of climb do you use, to base this one-engine requirement on?

Mr. CHAMBERLAIN. The rate of climb in this so-called second segment is based on the formula, which is 0.035 times the square of the stalling speed in that configuration. And I think for the C–46 it would amount to about 270 feet per minute, positive rate of climb.

Mr. MACK. Would that not be about standard for all aircraft? I mean, would it not be approximately 250 feet a minute for all aircraft at this same point?

Mr. CHAMBERLAIN. Well, within reasonable limits, I think. It is based on the particular stalling speed of the particular airplane. It is purely a function of that. And if the stalling speed were 20 miles higher than the C–46, that requirement would be correspondingly higher in climb. But I think within reasonable limits, your statement is relatively correct.

Mr. MACK. Then another question: If the C–47 was not in service prior to 1942, would it fall into the same category today as the C–46?

Mr. CHAMBERLAIN. Yes; it would, if it had been certificated prior to last year, when the requirements were modified for the irregulars also, to prevent introduction into service any time thereafter of a nontransport category airplane.

Mr. MACK. What weight would the C–47 be certificated at for the transport category requirements today, if you were considering the industry as to the C–46?

Mr. CHAMBERLAIN. As far as the performance requirements are concerned—and I would like to distinguish between merely the performance requirements of the transport category and the entire transport category, which includes some structural and equipment and flight characteristic requirements—but so far as the performance requirements of the transport category are concerned, I think it is a

relatively well established fact by CAA tests that both the DC–3 and the Lockheed Lodestar could still meet the transport category performance requirements at sea level particularly in these critical segments at weights higher than those at which they are currently being operated.

They do not happen to be limited at their present weights by this performance requirement.

Mr. HINSHAW. At sea level?

Mr. CHAMBERLAIN. At sea level. That is correct. At sea level they could actually tolerate an increase in their take-off weights, which would reduce correspondingly with altitude.

That is, I think, the key to the difficulty in presenting a clear picture to everyone in this situation. The DC–3 and the Lockheed, which happened to be the only airplanes used by the scheduled carriers in passenger service also happened to have an excess of performance in this critical area and thus have posed no problem at all so far as the difference between the old and the new regulations is concerned.

Mr. Chairman, if the committee wishes, I could read the one paragraph here from part 42, in the applicability, which might tend to answer the question Mr. Hinshaw brought up previously to Mr. Nunneley.

Mr. BECKWORTH. You may read it.

Mr. CHAMBERLAIN. This is 42.0, entitled "Applicability of Part 42," and I will read part B, which is the pertinent one here:

> An air carrier holding a scheduled air carrier operating certificate may elect to conduct charter flights or other special services between points which it is authorized to serve under the terms of such certificate, under the provisions of part 41 or 40 or 61, as the case may be, and the scheduled air carrier operating certificate:

Those part numbers are the operating parts applicable to scheduled carriers, similar to part 42 for the irregulars.

> *Provided*, That the certificate is amended to authorize such operation, and provided further that charter or special services to other points shall be conducted under the provisions of this part (42), except that it shall not be necessary for the air carrier to obtain an irregular air carrier operating certificate if its scheduled air carrier operating certificate is appropiately amended.

So the scheduled air carriers may elect to use their regular operating requirements for irregular passenger flights or charter flights when along their regular routes, to regular points. If there are off-route points, then they comply precisely with the requirements that apply to any scheduled air carrier.

Mr. BECKWORTH. I wanted to ask you this question. Will you state the number of hours you test these planes before you certificate them, in order to ascertain the facts as to the operation of a two-motored plane or a four-motored plane with one or two motors left? How much testing do you request be done before you actually certificate them?

Mr. CHAMBERLAIN. Well, it depends entirely upon the particular airplane type, but I would prefer to refer you to CAA for that, since they are the ones that actually do the testing. I think they could give you a more accurate figure on that than I could.

Mr. BECKWORTH. I will wait for that, then.

Mr. CHAMBERLAIN. I know the manufacturers indicate not too infrequently that it is too much.

Mr. HINSHAW. Now, in connection with the C-46, what are the limits that have been established for it, pursuant to the 1946 or earlier regulations, as to nonscheduled or irregular carriers?

Mr. CHAMBERLAIN. I am not sure I am clear on your question, Mr. Hinshaw. Weight limits, do you mean?

Mr. HINSHAW. The gross weight limits that have been established pursuant to this part 42, or whatever other part may have been established.

Mr. CHAMBERLAIN. The maximum weight for which there has been certification by CAA is 48,000 pounds. There have been two or three different certificates issued, I think five in all, to different applicants, for this particular airplane, and they have varied in weights depending upon the particular equipment, propellers, engines, and so forth; but the maximum weight—and I believe it applicable to most of the individual airplanes today—48,000 pounds.

Mr. HINSHAW. 48,000?

Mr. CHAMBERLAIN. 48,000; that is right, sir.

Mr. HINSHAW. Now, is that the same weight at which it was supposed to have been operated by the Military Establishment, who originally owned these airplanes?

Mr. CHAMBERLAIN. I am afraid I can't answer that very authoritatively. We have attempted to get the information from the military as to their operating weights, and it is a little difficult to interpret them in terms of civil requirements. They have several different weights, 48,000, 50,000, 55,000 pounds, with different labels on them, and it has been a little difficult for us to state precisely what the maximum weight would be that the military permits, that is truly comparable to our civil operating weights.

Mr. HINSHAW. I did not ask about those that were comparable to civil. I asked you what were the military weight limits.

Mr. CHAMBERLAIN. I would rather not attempt to quote from memory here, but we have that information, and I would be glad to furnish that to the committee. We have those weights that have been referred to.

Mr. HINSHAW. Will you furnish at this point the weight limits that have been applied by the military to that airplane both now and in the past?

Mr. CHAMBERLAIN. I would be glad to furnish that.

(The information referred to is as follows:)

The military maximum permissible take-off and landing weights of the C-46 airplane are as follows: United States Navy and United States Marine Corps, 52,000 pounds; United States Air Force, 55,000 pounds.

Mr. HINSHAW. Now, how many of these C–46's are in service today, with the scheduled and the nonscheduled carriers?

Mr. CHAMBERLAIN. I believe, if I recall, from the last report which CAA develops for their own purposes, furnishing a copy of it to us every month, the figure was 149. It is 149 total in their report issued January 22, 1952.

Mr. HINSHAW. What types of service, or how many aircraft?

Mr. CHAMBERLAIN. Fifty-three of those are shown in domestic scheduled cargo service, thirteen in scheduled international cargo service, and eighty-three in irregular service.

Mr. HINSHAW. The irregular service: Does that include both passenger and cargo?

Mr. CHAMBERLAIN. Yes; it does.

Mr. HINSHAW. And it is indistinguishable as to which is which?

Mr. CHAMBERLAIN. I can't give you precisely the figures on that, although here is one figure for Slick Airways, which I believe does not operate any passenger service. They have 21 C–46's, so we are sure they are scheduled cargo. Flying Tigers has 21, but I believe they operate both cargo and some passenger service. Then Pan American Airways has some in scheduled cargo service.

Mr. HINSHAW. I am talking about aside from the scheduled cargo service; only the scheduled carriers that you listed first; 53, I believe it was.

Mr. NUNNELEY. Perhaps I can give a little helpful information, Mr. Congressman. We recently asked the CAA to check, as far as they could, which C–46's were being used in passenger service and which were not. They were able to ascertain for us that, I believe, 72 were certificated for use in passenger service or combination passenger and cargo service. They were not able to say whether all of those were actually being used in passenger service at all times or not.

Mr. HINSHAW. I take it then that they are so equipped that the seats can be removed and they can be used for cargo; is that it?

Mr. NUNNELEY. Some of them are so equipped; yes, sir.

Mr. HINSHAW. And it is not known how many of them are definitely and permanently equipped for passenger service?

Mr. NUNNELEY. These figures did not show that.

Mr. HINSHAW. Is there anyone in the CAA here present who would know that figure? No one seems to reply, so I guess they do not know the exact figure.

If that figure can be obtained or approximately obtained, I think it ought to be in the record at this point. I suggest, Mr. Chamberlain, that you obtain the figure and place it in the record as far as your part of the testimony is concerned.

Mr. CHAMBERLAIN. Now, if I understand the question correctly, Mr. Hinshaw, it is: How many C–46's are used for passenger service?

Mr. HINSHAW. That is correct.

(The information referred to is as follows:)

Seventy-five C–46 airplanes are used for passenger service.

Mr. BECKWORTH. Mr. Chamberlain, this is a rather general question, but since there are some variations as to the scheduled and nonscheduled carriers, and on the other hand those who are contract carriers, does the CAA assume there is any appreciable difference in safety as applicable to the passenger who flies with any of these different operations?

Mr. CHAMBERLAIN. So far as the safety regulations are concerned, I think we have attempted to achieve as nearly a comparable level of safety as is possible, considering the inherent differences in the nature of the two operations.

There are certain things that are just inherently different and have to be by their very nature. You cannot expect pilot familiarity with terrain, for example, in the one case, because he is not sure of where he is going to go the next trip, and it is impossible to have the same kind of ground dispatching system or company-owned communications system for these carriers, because they are not operating and cannot operate regularly over fixed routes between fixed points. So those are,

I think, perhaps the three main inherent differences which have to be recognized.

Mr. BECKWORTH. Bearing in mind what you have said there, you require that changes be made to compensate for those differences, I assume, as to weight, and so forth?

Mr. CHAMBERLAIN. There is no specific weight difference that is allocated to that type of compensation, no. But as best we can, we attempt to write the irregular carrier rules perhaps a little more comprehensively, or stress certain elements that are more likely to be missed or overlooked, in an attempt to compensate. And we are constantly on the alert to that very type of thing. We have made many changes to the rules in the past few years, as I have referred to, and we are conducting another intensive review of them right at the moment, to see if we can't cover up some more of the points which seem, from experience, to need a little more specific treatment in the rules.

I think it is safe to say that basically the safety regulations contemplate fully an equivalent level of safety. It is difficult to assure that just because you say so in the regulations, you are going to achieve that same level of safety, due to the many inherent differences in the two types of operations.

Mr. HINSHAW. What is the maximum range of the C–46 under a 48,000 gross load limitation?

Mr. CHAMBERLAIN. Of course, that depends on how much so-called pay load is carried; I mean, how many passengers you have, versus the fuel.

Mr. HINSHAW. Let us say you have no passengers at all. How many gallons of gasoline are required, and how far will they carry it, or words to that effect?

Mr. CHAMBERLAIN. About 1,400 gallons of fuel is the maximum capacity, apparently, and that would amount to maybe 1,200 miles. Those figures are approximate, I think.

Mr. HINSHAW. And with 1,400 gallons of gas aboard, what is the capacity? With 1,400 gallons of gasoline and the appropriate amount of oil, what is the approximate load limit, approximately?

Mr. CHAMBERLAIN. Well, 1,400 gallons would be roughly 8,400 pounds of fuel. Apparently somewhere between eight and nine thousand pounds, in that general vicinity.

Mr. HINSHAW. Between eight and nine thousand pounds of load.

Mr. CHAMBERLAIN. That is right.

Mr. HINSHAW. Do you know whether or not in these operations that are conducted transcontinentally north and south, the cash loads in these aircraft are reduced to permit a higher load of passengers?

Mr. CHAMBERLAIN. I am not sure of that point; no, sir. It depends, of course, upon the particular length of the trip, the anticipated winds, and the required alternate airport, and so forth. I don't know what the actual requirement is there. We do have the fuel reserves specified in the regulations, and there is no difference there between the irregular and the scheduled carriers.

Mr. HINSHAW. The reason I asked the question was that I have noticed that according to the reports these planes will go out with as many as 56 and 60 passengers aboard, and I inquire whether it is customary for them to make en route stops for refueling, or whether they expect to run the entire length, distances such as New York to Miami, nonstop, or New York to Puerto Rico. Is that something

which is watched by some agency of the Government, or is no attention paid to it?

Mr. CHAMBERLAIN. No, I think that is one of the types of things that the CAA has been very alert to, to make sure that the regulations are not being abused, for example, that they are not either reducing the fuel too much below the minimum requirements, minimum safe requirements, to take advantage of passenger loads, or, on the other hand, that they are not taking off with obvious overloads, over the maximum authorized weight of the airplane, in order to carry both fuel and pay load. We know that CAA has been alert to that type of thing, and I think perhaps Mr. Hensley could give you a better picture of the current status of that than I could.

Mr. HINSHAW. Mr. Chairman, pretty soon I will want to get into the subject of the proposed reduction in gross load, allowable gross load, of these aircraft, which has been made by the Civil Aeronautics Board and the Administration, individually, separately, together, or whatever it is, but perhaps pending that we might hear from somebody in the CAA concerning the operating conditions and the inspections that are made, and so forth and so on.

Mr. BECKWORTH. You have no other general remark that you care to make?

Mr. CHAMBERLAIN. No, sir, I have not at this time.

Mr. BECKWORTH. To what extent do you, as the CAB, keep up with violations and failure to regard safety regulations which the CAA finds? Do they always turn over to you all their reports on things like that, and do you interest yourself in it? Or do you feel that it is something that you really have nothing to do with?

Mr. CHAMBERLAIN. No, sir. I think we are very interested in those, and the Board as a whole gets them in two different ways. I am not at all sure that we see all of the individual violations or reports of violations. I don't know that that is particularly significant. But we in the staff who are dealing with the safety regulations work all the time are in daily touch with the staff of CAA and constantly looking for places where violations are occurring and examining them to see whether or not they point to a necessary modification in the safety regulations.

Mr. BECKWORTH. Let us take a kind of a specific example.

Suppose you, Mr. Chamberlain in checking over the operations of a given airline, found that the CAA shows that within a period of, say, 4 or 5 months, there had been a multitude of violations by that line, and still the line would fly its routine flights.

What would be your reaction? What would you say? What would you request, if anything?

Mr. CHAMBERLAIN. Well, that particular situation is probably a little out of my particular bailiwick.

Mr. BECKWORTH. Well, you are the Director of the Bureau of Safety Regulations and therefore exceedingly interested in all phases of safety.

Mr. CHAMBERLAIN. That is correct.

Mr. BECKWORTH. What would be your reaction, and what would be the thing you would feel it your responsibility to do? You would know, for example, that if that continued and was a rather incessant thing, it might be dangerous.

Mr. CHAMBERLAIN. That is correct. Well, if the situation came to me as you stated it, I would naturally be very interested in what the detailed circumstances were, and what had permitted an accumulation of such instances without some action having been taken. The enforcement function, the legal enforcement function, which the Board had a very definite part in, does not come at all under my jurisdiction. I am interested in them, as I stated at first, from the standpoint of what we need to do, if anything, to plug up holes in the safety regulations. To that extent, I would and do whenever such things or any indication of that type of thing comes to my knowledge, go into it with my counterpart in the CAA, our staff counterparts there, to find out what needs to be done, what appears to be needed to be done, to take care of the regulations.

Now, I personally don't attempt to, or I would say I don't need to, because other normal processes would take over before that type of thing gets to my attention, usually——

Mr. BECKWORTH. What are they?

Mr. CHAMBERLAIN. I am thinking of our relationship between CAA and CAB in the enforcement function, which is totally outside of the jurisdiction of my Bureau.

Mr. BECKWORTH. One reason I asked that question: I know you are aware of the fact that, for example, in many States, and I know in my own State, there are regulations about violating speed limits and things like that. There is one thing out there that is a kind of a catch-all, that says if you keep on doing it, up to a certain point, then you lose your license to operate. Do you have something like that in your safety regulations? All that is in the interest of safety, you know, in the case of the car on the highway. You do not have a regulation like that?

Mr. CHAMBERLAIN. No, sir; we don't.

Mr. BECKWORTH. You have never sponsored one of that kind?

Mr. CHAMBERLAIN. No, I don't think we have. That seems more a regulation on the enforcement people than it does on the people flying airplanes.

Mr. HINSHAW. Mr. Chairman, may I ask a specific question?

Do you turn these violations over to the Enforcement Division, or add them up until you get a lot of them and turn them over, or what?

Mr. CHAMBERLAIN. I would say that normally the Board's enforcement people would come into possession of them long before I would.

Mr. HINSHAW. How so?

Mr. CHAMBERLAIN. Well, because I don't have anything specifically to do with the enforcement action. I come into possession of that type of information through my normal contacts with CAA usually, not from the standpoint of its being an enforcement as such, but as being an operational experience that points to the need for a change in safety regulations.

Now, if I come into possession of information of that type that I think hasn't reached the proper attention from the enforcement standpoint, I would get in touch with Mr. Nunneley, the general counsel, to see whether or not he was aware of it, and suggest that he carry on in that respect.

Mr. NUNNELEY. May I perhaps shed a little light on this situation? Normally, in the course of their ordinary activities, information regarding a violation of this character would come to our Bureau of

Accident Investigation rather than the Bureau of Safety Regulation.

Mr. HINSHAW. There is no accident involved.

Mr. NUNNELEY. I understand, sir, but their activities are not only limited to accident investigation. They perform the functions that the old Air Safety Board had, which extended into investigations, into various areas, in addition to those where accidents had occurred.

Mr. HINSHAW. Let us see, now. How does this stuff get to you for enforcement?

Mr. NUNNELEY. Normally, sir, it would not come to us for enforcement unless the CAA instituted a proceeding looking toward the suspension or revocation of an air safety certificate.

The CAB is not primarily charged with the enforcement function; that under Reorganization Plans 3 and 4 is in the CAA. The normal process is that their inspectors discover these violations which are assumed to exist, report them to their counsel, and if the CAA is satisfied that a reason exists, they institute proceedings, either to collect civil penalties, or in the appropriate case, a complaint seeking suspension or revocation is filed with the Board.

Mr. HINSHAW. It does not come to you, then, unless it is a case of suspension or revocation?

Mr. NUNNELEY. That is correct, under our statutes.

Mr. HINSHAW. Who conducts the hearings that assess fines for violations?

Mr. NUNNELEY. Fines, if you have to go to a hearing, must be brought in Federal court.

Mr. HINSHAW. That is a court proceeding?

Mr. NUNNELEY. A court proceeding is necessary to collect a civil penalty, if it is not compromised. The CAA has the power to compromise a civil penalty if the person against whom the violation is charged is willing to pay a stated sum in settlement of it. But if that person refuses and the CAA chooses to go forward, they must bring an action in court.

Mr. HINSHAW. Then it is within the power of the CAA to determine whether or not they will bring a proceeding in court looking toward a fine, or whether they will bring an action before the Board for suspension or revocation?

Mr. NUNNELEY. That is correct. That is their function, to exercise that discretionary power.

Mr. HINSHAW. That is within their discretion?

Mr. NUNNELEY. Yes, sir.

Mr. HINSHAW. And I would assume that if they thought that the violations were minor they would collect them and bring them up before a court for some kind of a judgment, or else they would compromise and merely assess a fine which would automatically be paid. Is that correct.

Mr. NUNNELEY. That has been done in a great many cases, yes, sir. If you are interested in the specific enforcement policy governing such matters, Mr. Boyle, associate general counsel of CAA, who is here, could state that better than I. But that has been done, to my own knowledge, in many cases. Then, of course, where the CAA believes that civil penalties are not an adequate remedy proceedings looking toward suspension or revocation of the air-carrier operating certificate or the pilot's license are brought before the Board, and are heard, if hearing is requested, before an examiner of the Board, who makes an

initial decision, from which an appeal lies to the Board itself if either party pursues that course.

Mr. HINSHAW. And whose attorneys represent the CAA in its complaint?

Mr. NUNNELEY. Attorneys in the general counsel's office of the CAA.

Mr. HINSHAW. The CAB has nothing to do with it then?

Mr. NUNNELEY. Except that it is a CAB examiner who sits and hears the case. We do not in any way prosecute the case.

Mr. BECKWORTH. Mr. Nunneley, the CAB does have a very primary responsibility, though, for safety; does it not?

Mr. NUNNELEY. Yes, sir.

Mr. BECKWORTH. You cannot deny that fact.

Mr. NUNNELEY. No, sir. I have no desire to deny it.

Mr. BECKWORTH. Now, this is getting at the question I was bringing up a moment ago. Suppose that the CAB, in reviewing the records of a given airline, sees that it has been guilty of countless violations, overloading of planes, or perhaps not having proper inspections, and so forth, and you see that that has been done for several months, or certainly several weeks, that it is a kind of a habit situation. Do I understand that you have no authority to interest yourself in that and try to do something about it in the interest of over-all safety?

Mr. NUNNELEY. No, sir; we do not consider that we have no interest or no function to perform. We would immediately take steps to call that situation to the attention of the Administrator, and if we felt that it appeared proper, to recommend that he take appropriate action. But it is his final responsibility. Nevertheless, we would take those steps, and have.

Mr. BECKWORTH. You have?

Mr. NUNNELEY. That is right. Yes, sir, we have, on a number of occasions, sent memoranda to the Administrator calling attention to situations in which we thought action by the Administrator would be appropriate. Final determination is his responsibility, of course.

Mr. BECKWORTH. Have you ever put out of business any airline for constant violations of safety rules and regulations?

Mr. NUNNELEY. Yes, we have. We have suspended or revoked some air-carrier operating certificates.

Mr. BECKWORTH. You say "revoked."

Mr. NUNNELEY. Yes, sir, we have revoked some. Not many, but some.

Mr. HINSHAW. Mr. Chairman, I would like to get back for one more moment to Mr. Chamberlain, on the subject of a C–46 and its sea-level operating characteristics in respect to load on its critical phase of take-off.

I believe you said that if that airplane were operating under the transport category, at that critical point its net pay load would be something less than one passenger at sea level.

Mr. CHAMBERLAIN. For an approximate 4-hour flight, I mentioned.

Mr. HINSHAW. For an approximate 4-hour flight.

Mr. CHAMBERLAIN. Yes, sir.

Mr. HINSHAW. Now, at altitudes such as Denver, what would that situation be, approximately? I realize there are calculations involved in it, and it is not an easy question to answer, but obviously, to me, it would be a good deal less than a passenger, for a 4-hour flight.

Mr. CHAMBERLAIN. That is right. I would estimate the weight might be reduced by something like four to five thousand pounds, roughly a pound per foot of elevation, say.

Mr. HINSHAW. In other words, the airplane empty of load, but with gasoline sufficient to carry it on a 4-hour flight, would be overloaded by some four or five thousand pounds?

Mr. CHAMBERLAIN. That is right. The average empty weight is in the neighborhood of 30,000 pounds, for the airplane, though it may vary somewhat from that. I think probably the permissible take-off weight at an elevation such as Denver wouldn't be any more than 31 or 32 thousand pounds.

Mr. HINSHAW. Now, in view of the fact that these aircraft were carrying passengers, although not on the scheduled service, is there any difference, in your mind, as to that aircraft and its usability in the passenger service, in contradistinction to one that can be certificated under the transport category, insofar as safety is concerned?

Mr. CHAMBERLAIN. I think it is rather elementary, sir, that if transport category requirements represent our current thinking as to the minimum requirements for safe operation, and this airplane cannot meet them, it does not come up to our idea of what ideally airplanes today should be. It is based solely on the practical aspects of the thing. We cannot design and build an airplane in a matter of days and put it into operation and exhaust its useful life by the time we have a new and better idea of what our future standards should be.

Mr. HINSHAW. There comes to my mind a paraphrase of an old saying, "A passenger is a passenger, for a' that," whether he be on a C–46 or C–54, or the equivalent in the civil category, a DC–4. And yet apparently, according to the statements we have heard concerning the performance abilities of the C–46, the passenger is under somewhat greater hazard in a C–46, if there is more than one aboard at sea level, than he would be in any airplanes I know of or have heard about today that are certificated in the transport category. Is that correct?

Mr. CHAMBERLAIN. I think that is correct, if you base it entirely on this one element of performance. I mean, there are many other aspects of this safety business, obviously, which have to be evaluated, but based on this one aspect of performance, that is correct.

Mr. HINSHAW. I take it that the Civil Aeronautics Board, is certificating this airplane for irregular carriage of passengers at 48,000 pounds, when its equivalent weight under the transport category for sea-level take-off is 36,000 pounds, believes that there are some other factors in respect to the C–46 that outweigh, so to speak, this lack of performance. Is that correct?

Mr. CHAMBERLAIN. That is entirely correct.

Mr. HINSHAW. And what are some of those characteristics?

Mr. CHAMBERLAIN. I think that was brought out in the recent release of the Board, the order to temporarily lower the weight, and proposing, coincidentally, another scheme of regulations, ultimately to apply to this airplane. And I think it is also backed up by the actual record of operation and accidents of the C–46. It is true that this airplane, measured against other airplanes in operation today, is deficient in this one respect, performancewise. It is extremely difficult, however, to prove that that one element in the actual operation

of this airplane over the past 5 or 6 years has been so significant that it clearly warrants reducing the weights to the extent that you would have to, to apply the new requirements.

Mr. HINSHAW. Well, now, we are talking about single-engine performance on take-off at sea level. Is the record of that aircraft for take-off at sea level, its critical point, any better than other airplanes?

Mr. CHAMBERLAIN. I don't know that it is any better. I mean that considering the entire group of accidents—and they number roughly 40 in the last 3 or 4 years—those which you can attribute in any part to a deficiency in performance in this critical area are very, very few.

It is very controversial as to whether or not two or three of them were really contributed to greatly by this one defect in performance, reported defect in performance.

Mr. HINSHAW. Can that same thing be said of the transport category certificated aircraft?

Mr. CHAMBERLAIN. I think it probably can, thinking over the accidents that come in my mind quickly. I think that probably can be said.

Mr. HINSHAW. I am trying to think of a passenger as a passenger, regardless of where he is and in what kinud of an airplane. He is still a passenger.

Mr. CHAMBERLAIN. The point I am trying to make is that while there is no question in anybody's mind but what this particular airplane is relatively deficient in performance in this particular regime, by and large other things have caused and contributed to the accidents that have happened to this type of airplane.

I think the accident reports of the Board will verify that. There has been deficient maintenance, for example, or overloads in some cases, and things have occurred which caused the accident, in totally different regimes of flight, in landing or en route, or something like that, where performance was not even questioned. So that our requirements are based on the ideal, let us say, and in actual practice this particular airplane I don't think has been actually in jeopardy because of this performance element.

Mr. HINSHAW. Mr. Chairman, I would assume that the Safety Division and the Civil Aeronautics Board under Mr. Chamberlain have some summaries of accidents that have taken place with this type of aircraft.

There were 40, you say, in the last couple of years; 40 such accidents?

Mr. CHAMBERLAIN. Yes; I think something like that. Statistics have been compiled in the last couple of weeks which I can make available.

Mr. HINSHAW. I think it would be a matter of interest to the committee to have that compilation.

Mr. CHAMBERLAIN. I would be very happy to provide that.

Mr. HINSHAW. Now, one more group of questions, perhaps. If it has poor single-engine performance under load at sea level, what about landing? Does the same situation prevail in that respect. One engine out on landing?

Mr. CHAMBERLAIN. Well, usually, that condition is not as critical, for at least two reasons. One is that you normally are at considerably less than the maximum take-off weight when you are landing. Nor-

mally you are, I say. And the other is that depending upon just what instant the failure of the engine occurs in the landing, you probably will have your airplane in what we call a cleaner configuration. I mean, the landing gear may not be down yet.

Mr. HINSHAW. Well, there is a critical point, a critical distance, let us say, on landing, which was obvious from recent occurrences, not in connection with the C–46; and I am wondering what would occur in case of an engine failure of landing with gear and flaps down and single engine performance coming in for a landing from a distance of perhaps as much as a mile and a half or 2 miles, what could be expected of the airplane at that point, whether it is any better or any worse than other types of aircraft.

Mr. CHAMBERLAIN. I think to the same degree that this airplane does not compare as favorably with other airplanes in the take-off, the same thing would apply in the landing configuration.

Mr. HINSHAW. What rate of climb would it have under some gross load, which means it has only an hour and a half of fuel left, and, say, 50 passengers aboard, or 55, or whatever the capacity of the plane is?

Mr. CHAMBERLAIN. It probably would be somewhere near the zero climb point, as a rough estimate. I think the so-called negative rate of climb which it has in this critical take-off regime is in the nature of 100 to 125 feet per minute. I could get some figures on that for you, sir. But relatively the C–46, if the propeller were not feathered and the gear were down, and you were in the last stages of the landing—I think you would find that the requirement in the transport category regulations would be critical with respect to weight there also.

Mr. HINSHAW. Mr. Chairman, I personally am very much interested in the statement just made because, after all, this committee has had brought to its attention the situation in respect to airports in the midst of crowded cities and the operation of airplanes into and out of airports where there are crowded cities adjacent to the airport, and it just seems to me offhand that some consideration should be given to the flying ability, the climbability, of an airplane which is coming in for a landing or taking off, in the event that one engine fails. That is not unheard of, I might say, especially in view of this committee's work thus far, and it is quite an important matter to my mind as to whether the two-engine airplane that does not have single-engine performance, or a four-engine airplane that does not have two-engine performance, might be quite a hazard to crowded areas in the vicinities of airports.

Mr. BECKWORTH. Are you reexamining that whole thing now, Mr. Chamberlain? The question of the hazard that relates to people who are flying in areas of the type that Mr. Hinshaw has just mentioned, and the hazard that relates to people who are on the ground?

I would assume that you are, based on these accidents that have occurred, since you are interested and the CAB is interested in the over-all safety of all.

Mr. CHAMBERLAIN. That is correct. I might say we lose no time after any one of these accidents or incidents in looking at the regulations again.

Mr. BECKWORTH. That is good. I am thinking not so much with reference to what you do after an accident occurs, but looking at the

over-all problem toward which we are moving, if we are moving, as a result of the concentration of people near areas where planes like Mr. Hinshaw has described are constantly flying.

Mr. CHAMBERLAIN. I think it is fair to say that the present transport category requirements are based not only on the consideration of the passengers in the airplane but on the people on the ground in the vicinity of airports, and that is one of the reasons why this one-engine-out requirement is a part of that.

Mr. HINSHAW. That is the transport category. This airplane does not meet the transport category requirements in those two important circumstances which are liable to occur in the immediate vicinity of airports.

Mr. CHAMBERLAIN. That is correct.

Now, with respect to the specific airplane, the C–46, I have assumed that the committee is aware of the activities of the Board within the last several months in examining this whole C–46 problem to determine what the appropriate set of requirements would be by which to certificate this airplane.

A notice of proposed rule making was put out in July of last year, and created quite a little opposition among the operators of the C–46, as is probably known to the committee.

A public hearing was held by the Board, held last October, I believe, and an examiner's report has very recently been issued, and the results of this whole investigation will be made known by the Board in the matter of a very few days or weeks.

And so I think it is quite obvious that the Board is fully aware of the problem that exists, that a problem does exist here, and they are seeking the most feasible and reasonable means of applying the proper rules to this particular airplane.

I do not know whether the committee has in its records the documents with respect to these actions or not. I have copies of them here, the two notices of proposed rule making, which I would be happy to leave if the committee wishes.

Mr. HINSHAW. I do not believe we have those documents, Mr. Chairman, and I suggest that they be accepted into the record.

Mr. BECKWORTH. Without objection, they will be accepted.

(The material referred to is as follows:)

NOTICES OF PROPOSED RULE-MAKING IN C–46 CASE

CIVIL AERONAUTICS BOARD

(14 CFR, Parts 3 and 42)

MAXIMUM WEIGHTS FOR C–46 AIRPLANES

NOTICE OF PROPOSED RULE MAKING

Notice is hereby given that the Civil Aeronautics Board has under consideration the adoption of a proposed Special Civil Air Regulation as hereinafter set forth.

Interested persons may participate in the making of the proposed rule by submitting such written data, views, or arguments as they may desire. Communications should be submitted in duplicate to the Civil Aeronautics Board, attention Bureau of Safety Regulation, Washington 25, D. C. All communications received by August 15, 1951, will be considered by the Board before taking further action on the proposed rule. Copies of such communications will be available after August 17, 1951, for examination by interested persons at the Docket Section of the Board, Room 5412, Commerce Building, Washington, D. C.

The C–46 airplane was originally used by the armed forces as a military trans-

port type and was made available for civil use in 1947. To place these airplanes into civil operation it was necessary to obtain type certification by showing compliance with pertinent provisions of the Civil Air Regulations. It became apparent that these airplanes could not meet the requirements of the transport category at weights sufficiently high to allow economic operations, but that they could meet the nontransport category requirements. Five individual applications for type certification were made, and, as a result, there are now in existence five different type certificates. Certification of the C–46 under provisions other than those prescribed for the transport category made the C–46 ineligible for the carriage of passengers in scheduled operations, except as otherwise authorized by the Board. Thus, the majority of existing airplanes of this type are now either in cargo or in irregular passenger service.

The accident record of the C–46 in civil operations disclosed a relatively high accident rate. An analysis of the accidents indicates that certain deficiencies in performance of the C–46 have been an important factor. It is evident that at the weights permitted for the C–46 the performance level of safety for this type airplane is lower than that of airplanes fully certificated under the transport category. The maximum weights prescribed in the five type certificates vary between 42,500 and 48,000 pounds. To evaluate the performance of the C–46 airplane at these permissible weights as compared with that of the transport category, the Administrator of Civil Aeronautics conducted special flight tests in accordance with the transport category performance requirements. These tests showed that the performance obtained from the C–46 at currently authorized weights is substantially lower than that which would be attained if the transport category performance requirements were applied in full. In particular, at 48,000 pounds, the take-off performance is insufficient for the airplane to continue flight if one of the engines should fail during the critical phase of the take-off, and in addition, the airplane at such weight, will not meet the single engine en route performance requirements of Part 3. The Administrator's tests do show, however, that the airplanes will meet the Part 3 requirements at a maximum weight of 45,800 pounds although the full transport category performance requirements will still not be met in full. These latter requirements can be met only at weights below 40,000 pounds. In this connection it was ascertained that the maximum weight of 48,000 pounds allowed for certain airplanes of this type was based upon tests conducted under exceptionally favorable conditions. In view of these considerations, the Board believes that for passenger operation some of the currently authorized weights result in inadequate performance. Accordingly, the Board proposes to increase such performance in commercial passenger operations by lowering certain of the presently allowable maximum weights.

For these reasons the Board is proposing that on the effective date of this regulation, in respect of commercial passenger operations, the authorized maximum weight of certain of the currently certificated C–46 airplanes be substantially reduced, and that 1 year from such date it be still further reduced in accordance with the standards established by this regulation. In order to make certain that the maximum weights will not be exceeded inadvertently, the proposed regulation also requires that all C–46 type airplanes be reweighed under the supervision of the Administrator. It will be noted that the regulation will require that such weighing take place within the 60 days preceding October 1, 1951, the effective date of the proposed regulation. The Board has been advised by the Administrator that he is prepared to undertake his portion of this work immediately.

It is therefore proposed to issue a Special Civil Air Regulation to become effective October 1, 1951, to read as follows:

"1. No C–46 type airplane shall be used for the carriage of persons or property for remuneration or hire unless, subsequent to August 1, 1951, it has been reweighed under the supervision of the Administrator.

"2. The maximum weight of all C–46 type airplanes used for the carriage of passengers for remuneration or hire shall be limited to a value determined in compliance with the provisions of Part 3 of the Civil Air Regulations, except that in no case shall the maximum weight be greater than 45,800 pounds for models equipped with P&W R–2800 series engines. Where application is made for the upward adjustment of maximum weights from presently effective values which are lower than 45,800 pounds, such adjustment shall be substantiated by flight tests which the Administrator finds necessary.

"3. After October 1, 1952, the maximum weight of all C–46 type airplanes used in the carriage of passengers for remuneration or hire shall be further limited to a value corresponding with a rate of climb not less than zero at sea level in the

take-off configuration with the landing gear retracted and the propeller windmilling, except that in no case shall the maximum weight be greater than 43,500 pounds for models equipped with P&W R-2800 series engines.

"4. The maximum weight of all C-46 type airplanes used for the carriage of cargo only shall be limited to those values presently permitted, as listed in the pertinent Aircraft Specifications, except that for airplanes which are equipped with engines other than the P&W R-2800 series, the maximum weight shall be limited to a value determined in compliance with the provisions of Part 3 of the Civil Air Regulations.

"This regulation shall terminate December 31, 1953, unless sooner superseded or rescinded."

This amendment is proposed under the authority of Title VI of the Civil Aeronautics Act of 1938, as amended.

(Sec. 205 (a), 52 Stat. 984; 49 U. S. C. 425 (a). Interpret or apply secs. 601-610, 52 Stat. 1007-1012; 49 U. S. C. 551-560)

Dated July 6, 1951 at Washington, D. C.
By the Civil Aeronautics Board:

/s/ M. C. Mulligan,
M. C. Mulligan, *Secretary.*

[SEAL]

July 18, 1951.

Board Proposes to Limit Maximum Operating Weight of Curtiss C-46 Passenger Transports

In a "Notice of Proposed Rule Making" the Civil Aeronautics Board announced today that it had under consideration a regulation that would reduce the presently allowable maximum operating weights of certain C-46 (Curtiss Commando) passenger transport aircraft, after October 1, 1951.

The Board said that it proposed to reduce permissible maximum weight of the C-46 passenger transports in two stages; the first stage, effective on October 1, 1951, would limit the maximum operating weight to 45,800 pounds, and the second stage, effective on October 1, 1952, would limit the weight of C-46 passenger aircraft to 43,500 pounds. At the present time some operators have been operating the C-46 with a permissible maximum weight of 48,000 pounds.

In explaining its reasons for proposing this amendment to its safety regulations, the Board stated that an intensive reinvestigation of the performance capabilities of the C-46 had been conducted by the Administrator of Civil Aeronautics in January 1951. These tests, initiated as a result of several fatal accidents, showed that this model aircraft is markedly deficient in single-engine performance at certain of the maximum weights now authorized.

In particular, at 48,000 pounds, the take-off performance is insufficient for the airplane to continue flight if one of the engines should fail during the critical phase of the take-off, and in addition, the airplane at such weight will not meet the single-engine en route performance requirements of Part 3, the governing Civil Air Regulation. The Administrator's tests do show, however, that the airplane will meet the Part 3 requirements at a maximum weight of 45,800 pounds, although the complete transport category performance requirements will still not be met in full. In this connection it was ascertained that the maximum weight of 48,000 pounds allowed for certain airplanes of this type was based upon tests conducted under exceptionally favorable conditions. In view of these considerations, the Board believes that for passenger operation some of the currently authorized weights result in inadequate performance. Accordingly, the Board proposes to increase such performance in commercial passenger operations by lowering certain of the presently allowable maximum weights.

The C-46 airplane was developed by the Curtiss-Wright Corporation and used in military air transport operations during World War II and became available for civil aviation use in 1947. The Board said that the C-46 was not intended for operation under the strict regulations governing civil transport category airplanes and consequently had never become eligible for use in scheduled airline passenger operations.

Serial Number S–441

UNITED STATES OF AMERICA

CIVIL AERONAUTICS BOARD

Washington, D. C.

Adopted by the Civil Aeronautics Board at its office in Washington, D. C., on the 30th day of August 1951.

In the matter of a proceeding to determine whether, and to what extent, a reduction in currently authorized maximum take-off weights for C–46 aircraft in the carriage of persons for compensation or hire in air commerce is required in the interest of safety. Docket No. 5107

ORDER INSTITUTING PROCEEDING

Under date of July 6, 1951, the Civil Aeronautics Board approved for publication in the Federal Register a notice of proposed rule making which, if adopted, would limit effective October 1, 1951, the maximum weight of all C–46 airplanes when used for the carriage of passengers for remuneration or hire to a weight no greater than 45,800 pounds for models equipped with Pratt & Whitney R–2800 series engines. A further limitation upon such maximum weight to 43,500 pounds effective October 1, 1952, was also proposed. This notice of proposed rule making was published in the Federal Register under date of July 19, 1951, and was distributed by mail to all owners of record of C–46 type airplanes on July 18, 1951.

Numerous comments have been received from interested members of the public in response to the aforesaid notice of proposed rule making. Some of these comments have challenged the factual basis recited in the notice upon which the Board relied. Others have indicated that the desired performance level could be obtained by a means other than a reduction in the maximum take-off weight. Most of those commenting have requested a full public hearing on the matter.

The Board, fully recognizing the importance of this regulation to the operators of C–46 type aircraft, and desiring the benefit of a full and complete record on this subject with opportunity to all owners of C–46 type aircraft and other interested persons to participate in the making of such record by presenting sworn-testimony and other evidence, cross-examined witnesses and presenting arguments to the Board, has determined to set this matter down for public hearing before an examiner of the Board.

The Board acting pursuant to the authority vested in it by the Civil Aeronautics Act of 1938, as amended, particularly Sections 205 (a), 601, 604, and 1002 (b) thereof, and finding that its action herein is necessary and proper in order to carry out the provisions of said Act and is consistent with the public interest;

It is ordered:

1. That a proceeding be and hereby is instituted to determine (1) whether the interest of safety requires any reduction in the currently authorized maximum certificated take-off weights of C–46 airplanes when used for the carriage of passengers for remuneration or hire in air commerce, and if so to what extent; (2) whether other methods, procedures, or appliances should be required or authorized in C–46 operations in lieu of a reduction in the maximum authorized take-off weight which would produce the same performance characteristics; and (3) the earliest date or dates on which any such regulation may reasonably be put into effect;

2. That Aircoach Transport Association, Inc., Airline Pilots Association, Air Transport Association, Inc., American Air Transport, Inc., Continental Charters, Inc., Counsel for C–46 Engineering, The Flying Tiger Lines, Inc., Lake Central Airlines, Miami Airline, Inc., Resort Airlines, Inc., S. S. W., Inc., and Administrator of Civil Aeronautics, be and they hereby are made parties to such proceeding.

3. That a hearing in the above entitled proceeding be assigned to be held on September 24, 1951, at a time and place to be subsequently notified to all parties before an examiner of the Board, who shall report the facts to the Board without recommendation as to decision.

4. That any exhibits desired to be introduced by the parties to this proceeding shall be filed in triplicate with the Board and copies furnished each of the other parties on or before September 17, 1951.

By the Civil Aeronautics Board:

[SEAL] /s/ M. C. Mulligan,
M. C. MULLIGAN, *Secretary.*

Serial Number SR-379

UNITED STATES OF AMERICA

CIVIL AERONAUTICS BOARD

Washington, D. C.

Effective: January 31, 1952
Adopted: January 31, 1952

SPECIAL CIVIL AIR REGULATION—APPLICATION OF CERTAIN TRANSPORT CATEGORY PERFORMANCE REQUIREMENTS TO THE C-46 TYPE AIRCRAFT

It appearing that:

1. On July 6, 1951, the Board issued a notice of Proposed Rule Making under which the standards applicable to the C-46 with respect to the maximum certificated weight for passenger operations would be modified.

2. Thereafter in the light of certain protests and requests for hearing as to the factual basis for the proposed rule, the Board instituted a proceeding on the matter of the modification of the requirements with respect to the weight of the C-46 in the interest of safety, and set it down for hearing before an Examiner; this proceeding is still pending before the Board, the Examiner's Report, containing his findings of fact but no recommended conclusions, having just been issued.

3. In the last 50 days there have been three accidents in common carrier operation involving C-46 aircraft; two of these accidents resulted in the loss of 82 lives.

4. The occurrence of these accidents has resulted in the Board's institution of formal investigations to determine the causes of such accidents and informal investigations concerning the safety of operations and maintenance practices and procedures of the specific carriers concerned in the accidents.

5. Preliminary data obtained from the formal and informal investigations and from other sources of information available to the Board have indicated an apparent laxness in operating practices and procedures followed by the carriers investigated in some or in all of the following aspects:

(a) Failure to maintain pilot training and proficiency at a desirably high level;

(b) Failure to ensure aircraft and engine maintenance at a desirably high level; and

(c) Failure on the part of the companies and their personnel to follow certain operating procedures established in accordance with the Civil Air Regulations, including those pertaining to maximum operating weights.

6. The accident record of the C-46 aircraft in irregular carrier operation since 1947 shows 39 accidents. Seven involved the loss of power of one engine, 24 the factor of pilot error, and 9 the failure on the part of other personnel including maintenance personnel.

Five of the seven accidents involving loss of one engine occurred on take-off, and all five of such accidents at least partially resulted from inadequate maintenance. In the sixth case, one engine failed in cruising flight, and soon thereafter the other failed, necessitating a forced landing in the ocean. In the seventh case, fire in one engine occurred during normal flight necessitating an emergency landing.

According to best estimates, the irregular carriers operated 32,598,000 C-46 plane miles during 1950-51 with the rate of 6.4 accidents per 10 million plane miles. The Board regards this rate as being unnecessarily high and not in line with the accident rates on other aircraft.

7. The Civil Air Regulations currently provide two general standards for airworthiness—the Normal category (Part 3) and the Transport category (Parts 4a, 4b). The DC-3 and the Lockheed 18 were both introduced into service prior to the time the transport category requirements were adopted, and con-

sequently are not certificated under these standards. However, both these airplanes will at sea level meet and even exceed the performance requirements of Part 4b. The C–46 was certificated under Part 3 of the Civil Air Regulations and cannot comply with the take-off performance requirements of the transport category at the maximum certificated weight at which it is now operated (see Examiner's Report, Docket No. 5107, p. 11, f. n. 9). Thus, the C–46 is the only large multiengine aircraft in general passenger use which at sea level will not comply with the take-off performance requirements of Part 4b, at the maximum certificated weight at which it is operated, i. e., 48,000 pounds.

8. The provision in Part 4b of the Civil Air Regulations for transport category aircraft which performance-wise would, if applied, constitute the effective limit of the maximum certificated take-off weight of the C–46 is that which requires the single-engine rate of climb, in the take-off configuration with the landing gear retracted and the inoperative propeller windmilling, to be not less than 0.035 V_{s_1}; where V_{s_1} is the established stalling speed in the pertinent configuration. In determining the maximum take-off weights under the Transport category, it is assumed that (1) the foregoing configuration will be encountered shortly after a take-off during which one engine fails at the most critical point during the ground run and the pilot continues the take-off, and (2) that the pilot will not start to feather the propeller until a height of 50 feet is reached.

On the basis of the foregoing and recognizing that safety in the air is accomplished not by any single means, but by constant attention to the improvement of maintenance and of operating practices and procedures, by constant attention to the development of greater pilot skill and proficiency and by development of appropriate standards for the performance of aircraft, and further recognizing that many accidents are caused, not by a single factor but by a combination of circumstances which may embrace any or all of the foregoing factors, the Board is of the opinion and finds that in the case of the C–46 aircraft, an emergency exists which requires that immediate action should be taken to apply to this aircraft standards of performance more nearly comparable to those met by other aircraft used in passenger service which will necessarily result in lowering the maximum weight of this aircraft, thus providing a further margin of safety. In so doing the Board recognizes that the present accident record of the C–46 aircraft does not demonstrate conclusively that any single accident is entirely the result of the weight factor, but has in mind the truism that the lighter the total weight of the aircraft, the higher its operating performance can be expected to be and the easier it will be to fly safely. The Board in making its present determination is acting only upon the present state of facts and without prejudice to a determination as to what the ultimate standards for determining the maximum weight of the aircraft should be.

The Board's action is designed to increase the safety factor for the interim period which will be necessary before the Board can finally decide all of the various questions involved in this problem and before such program as may be found necessary can be fully implemented. It is anticipated that the Board in conjunction with the Administrator of Civil Aeronautics will proceed with its efforts to arrive at a conclusion as to the proper safety rules under which the C–46 aircraft is to be operated in passenger service on a continuing basis and that the maintenance and operating practices and procedures of the operators of the C–46 aircraft will be more strictly supervised and examined.

The Board, in a Notice of Proposed Rule Making to be published concurrently with the issuance of this regulation, proposes to examine the question whether it is necessary in the interest of safety to apply, on a permanent basis, the Part 4b performance requirements, with the exception of those applicable to the second segment of the take-off climb, to C–46 aircraft operated for the carriage of passengers for remuneration or hire. In the interim, and pending the accomplishment of the foregoing, which cannot be completed soon enough to obviate the necessity for this emergency regulation, it is the Board's intention to require immediately that any C–46 operated in passenger-carrying service be limited to a maximum weight of 45,000 pounds. This weight was determined substantially in accordance with the take-off performance requirements of the transport category, but with the aircraft permitted to meet the second segment rate of climb requirement as though it were in the third segment configuration, I. e., the propeller feathered, and with no further weight reduction for airport elevations.

The precise maximum weight at which the C–46 aircraft will meet the standards which the Board desires to impose cannot be definitely ascertained at this

time since uncontested data are not available. In his report, the Examiner mentions the weight of 45,400, 44,300, and 43,600 lbs., as possible weights at which the standards mentioned above would be met, depending upon what data are relied on. As an interim measure the Board has decided to use a value of 45,000 lbs. While it is realized that this value is not an exact one in an engineering sense, the Board believes it to be a fair one. As this is a value to be used only during the interim period, the Board does not intend to propose different values to account for the differences between the C–46 E and F models, or between the aircraft equipped with the Hamilton Standard and Curtiss propellers. The limitations imposed herein are in addition to those already in effect, and this action in no way authorizes operation of C–46 aircraft in excess of maximum weights already established pursuant to other existing requirements.

Temporarily, at least, the Board intends to permit the irregular operators to continue to operate their C–46 aircraft under the nontransport category operating limitations of Part 42 of the Civil Air Regulations, namely, § § 42.80—42.83. It is believed that the application of these operating rules to the C–46 has resulted in increased safety and that they are adequate for the present. The Board is currently considering this entire matter further and may propose modifications to those operating rules which would be applicable to the C–46 and other nontransport category aircraft at a later date. The Board intends to apply this modified transport category requirement only to aircraft being operated in passenger service and it is proposed, therefore, that all C–46 aircraft used in cargo service, at least for the present, continue to be operated at the weights determined in accordance with the existing standards applicable to such aircraft.

In reaching the determination on an emergency temporary basis to apply standards which will lower the maximum weight of the C–46 aircraft in passenger service, the Board is not unmindful that there will be certain economic effects on the carriers who operate this aircraft in passenger service. However, the weight at which the Board has determined the aircraft should be flown pending final disposition of the matter is approximately the weight at which some of the C–46 aircraft are already being operated in passenger service by a number of irregular carriers and the Board's action herein will not prevent the continued operation of the aircraft carrying substantial traffic loads. Furthermore, the operation of the C–46 over shorter distances will make it possible to minimize the loss of passenger-carrying capacity which is now figured on the basis of fairly long-range operations. In any event, the Board finds that such economic losses as may accure to the operators of the C–46 in passenger service as a result of the Board's action are more than outweighed by the additional safety sought to be accomplished.

In view of the foregoing, the Board is of the opinion that an emergency requiring immediate action exists in respect of safety in air commerce, that notice and public procedure hereon are impracticable, and that the following Special Civil Air Regulation is required in the interest of safety.

In order that an appropriate basis for final rule-making action with respect to the performance standards to be met by the C–46 aircraft operated for the transportation of passengers by irregular carriers may be fully explored, the Board is issuing concurrently herewith a Notice of Proposed Rule-Making proposing performance standards consistent with the interim action taken herein, as a possible alternative to the proposal issued on July 6, 1951, which based the ultimate take-off weight upon a zero rate of climb in the take-off configuration. The Board will receive written comments and will hear oral argument on such notice, at the same time as oral argument is heard in the C–46 investigation referred to in paragraph 2 of this Special Regulation.

Accordingly, the Civil Aeronautics Board hereby makes and promulgates a Special Civil Air Regulation effective immediately until further order of the Board, to read as follows:

"After 12:01 A. M. Eastern Standard time February 3, 1952, all C–46 type aircraft used for the carriage of passengers for remuneration or hire shall be limited not to exceed a maximum take-off and landing weight of 45,000 lbs."

(Sec. 205 (a), 52 Stat. 984; 49 U. S. C. 425 (a). Interpret or apply Secs. 601, 1005, 54 Stat. 1007, 1023; 49 U. S. C. 551, 645.)

By the Civil Aeronautics Board:

/s/ M. C. Mulligan,
M. C. Mulligan,
Secretary.

[SEAL]

Members Lee and Adams, dissenting:

We dissent because the regulation would not have prevented any of the accidents relied upon by the majority as justification for this emergency action. Overweight was not the probable cause in any of the accidents referred to. The Board has conducted lengthy hearings on the gross weight of the C–46. The examiner's report has been released and in the very near future the Board will have the opportunity to pass upon this question, after all parties have been heard and all facts carefully examined.

/s/ JOSH LEE
/s/ JOSEPH P. ADAMS.

CIVIL AERONAUTICS BOARD

PERFORMANCE STANDARDS FOR NONTRANSPORT CATEGORY AIRCRAFT USED IN PASSENGER OPERATIONS

JANUARY 31, 1952.

NOTICE OF PROPOSED RULE MAKING

Notice is hereby given that the Civil Aeronautics Board has under consideration the adoption of a proposed Special Civil Air Regulation as hereinafter set forth.

Interested persons may participate in the making of the proposed rule by submitting such written data, views, or arguments as they may desire. Communications should be submitted in duplicate to the Civil Aeronautics Board, attention Bureau of Safety Regulation, Washington 25, D. C. All communications received by February 22, 1952, will be considered by the Board before taking further action on the proposed rule. Copies of such communications will be available after February 25, 1952, for examination by interested persons at the Docket Section of the Board, Room 5412, Commerce Building, Washington, D. C.

In addition to the receipt of written comments by the aforesaid date, the Board will set this matter down for oral argument concurrently with oral argument before the Board on the matter now pending before it in the C–46 Investigation, Docket No. 5107.

The reasons why the Board believes it necessary to propose action prescribing additional performance standards to be applicable to the C–46 aircraft operated by irregular carriers in passenger service are set forth at length in the Special Civil Air Regulation issued concurrently herewith fixing temporary maximum weights for C–46 aircraft as an emergency action.

The Board's action in promulgating such emergency regulation does not represent a determination, upon all the facts and circumstances which may be before it on final consideration of this matter and in the light of other programs regarding pilot proficiency, maintenance and operating procedures which may be put in effect, that standards further limiting the maximum weight of the C–46 aircraft will necessarily be promulgated. However, on the basis of the facts presently known to the Board as recited in said Special Civil Air Regulation, it appears that such a rule might be in the interest of safety in air commerce. Furthermore, such a rule would ensure substantially the same level of safety during the take-off climb as would the proposal for ultimate application in the Board's Notice of Proposed Rule-Making of July 6, 1951.

In view of the foregoing, the Board has under consideration the issuance of a special Civil Air Regulation which would require that all C–46 aircraft used for the carriage of passengers for remuneration or hire be limited to maximum take-off and landing weights determined in accordance with the performance requirements of Part 4b of the Civil Air Regulations, except that in determining the maximum take-off weight the latter shall be limited only to a value at which the aircraft has a rate of climb equal to $0.035\ V_{s_1}^2$ in the take-off configuration with the landing gear retracted but with the inoperative propeller feathered rather than windmilling.

It is further proposed that, if such amendment is promulgated, the present Special Civil Air Regulation providing a maximum limit not to exceed 45,000 pounds shall remain in effect unless or until the Administrator, on the basis of such tests and data already compiled or such further tests as he may deem appropriate has determined a maximum take-off and landing weight in accordance with the requirements thus to be prescribed.

The Board recognizes, moreover, the fact that an operator or a group of operators of the C–46 may wish to undertake a program for testing the aircraft

to determine its performance under the transport category rules. Further, the Board recognizes that modifications, such as the shortening of the Hamilton Standard propeller which has been reported to result in improved performance of the aircraft, are possible and it would welcome quantitative test data obtained with such modifications.

This amendment is proposed under the authority of Title VI of the Civil Aeronautics Act of 1938, as amended.

(Sec. 205 (a), 52 Stat. 984; 49 U. S. C. 425 (a). Interpret or apply Secs. 601-610, 52 Stat. 1007-1012; 49 U. S. C. 551-560.)

Dated: January 31, 1952, at Washington, D. C.

By the Civil Aeronautics Board:

[SEAL] /s/ M. C. Mulligan,
M. C. MULLIGAN, *Secretary.*

FEBRUARY 1, 1952.

CIVIL AERONAUTICS BOARD ADOPTS EMERGENCY REGULATION REDUCING MAXIMUM WEIGHT OF C–46 PASSENGER AIRCRAFT

The Civil Aeronautics Board today adopted, with the concurrence of the Administrator of Civil Aeronautics, an emergency temporary regulation which will reduce the maximum take-off and landing weight of the C–46 aircraft used in passenger service to 45,000 pounds. Until today's emergency action the maximum weight has been 48,000 pounds. The regulation becomes effective at 12:01 a. m., Eastern Standard Time, February 3, 1952, and the Administrator of Civil Aeronautics has been requested by the Civil Aeronautics Board to dispatch telegrams immediately to all operators of C–46's in passenger service apprising them of the new weight limitation.

The Board viewed its action today as part of a program designed to increase safety in the operations of the C–46 by civilian operators in the military and civilian passenger-carrying services. Another part of the over-all program includes the review of applicable Civil Air Regulations with the idea of possible changes to improve safety standards. The Board's emergency action was premised in part upon formal and informal investigations of recent accidents to passenger-carrying C–46's, in which a total of 82 lives were lost. Based on the investigations of the irregular air carriers involved in the three accidents and other available sources of information, the Board found an apparent laxness in operating practices and procedures of the carriers investigated, in some or in all of the following aspects:

(a) Failure to maintain pilot training and proficiency at a desirably high level;

(b) Failure to ensure aircraft and engine maintenance at a desirably high level; and

(c) Failure on the part of the companies and their personnel to follow certain operating procedures established in accordance with the Civil Air Regulations, including those pertaining to maximum operating weights.

Furthermore, the Board's analysis of the accident record of the C–46 in irregular air carrier operations for the 1950–1951 period disclosed an incidence of 6.4 accidents per 10,000,000 plane miles, which the Board regards as being unnecessarily high and not in line with the accident rates on other aircraft.

The Board recognized that safety in the air is accomplished not by any single means, but by constant attention to the improvement of maintenance and of operating practices and procedures, by constant attention to the development of greater pilot skill and proficiency and by development of appropriate standards for the performance of aircraft, and further recognized that many accidents are caused not by a single factor but by a combination of circumstances. The Board reasoned that in view of its findings in connection with the general level of operations, pilot proficiency and maintenance, an additional safety factor should immediately be imposed by the reduction of weight on the C–46 aircraft which will improve its performance.

The Board stated that its emergency action in reducing the maximum weight of the C–46 passenger aircraft will have the result of immediately increasing the safety factor in the operation of this aircraft pending further consideration by the Board of the adequacy of its regulations, which will require additional time to complete.

The Board recognized that a proceeding is under way in which the proper maximum weight of C–46 operations is under examination and concurrently with its action today published a Notice of Proposed Rule Making which specifically poses the issue whether the Transport-Category requirements of the Civil Air Regulations, with certain modifications should be made applicable to C–46 aircraft. The Board stressed the fact that its emergency action taken today is an interim measure designed to give additional safety to the operation of the C–46 aircraft in passenger service until such time as the proper maximum take-off and landing weights can be definitely established. It is proposed that the existing investigation (Docket 5107) together with the proposed rule published today go forward simultaneously to oral argument as soon as is feasible so that the effective period of the Board's emergency regulation will not be unduly prolonged.

In taking its action today the Board pointed out that it is aware that the reduction in the maximum take-off and landing weights will produce certain adverse economic effects on the carriers who operate the C–46 aircraft in passenger service but pointed out that some C–46 aircraft are presently being operated with a maximum weight of 45,000 pounds and that 45,000 pounds is the weight at which the original certification of the C–46 was made by the Civil Aeronautics Administration. It was further noted that, by reducing the length of hops, it will be possible for the operators of C–46 aircraft to minimize the loss of passenger-carrying capacity as a result of the weight limitation.

Members Lee and Adams, dissenting:

We dissent because the regulation would not have prevented any of the accidents relied upon by the majority as justification for this emergency action. Overweight was not the probable cause in any of the accidents referred to. The Board has conducted lengthy hearings on the gross weight of the C–46. The examiner's report has been released and in the very near future the Board will have the opportunity to pass upon this question, after all parties have been heard and all facts carefully examined.

Mr. HINSHAW. And I desire to reiterate my statement that this has become quite a problem and one apparently that has been thrown somewhat in the laps of this committee, at least by headlines that I read yesterday. And our concern is no small matter, I assure you.

In other words, we are thinking not only of the airplane itself and its ability to land and take off and clear obstacles, and so forth, but we are thinking of whatever hazard may exist in the past, and not necessarily in the airplane. And if the performance characteristics are such that they are bad, then I think that consideration should be given by the Board, very careful consideration, as to whether or not an airplane of that type, with such characteristics, should be permitted in such areas.

Now, I want to go into a somewhat different subject, Mr. Chairman.

Mr. BECKWORTH. Go ahead.

Mr. HINSHAW. Do you, Mr. Chamberlain, have to do with the requirements of air carriers of all kinds, as to pilot training?

Mr. CHAMBERLAIN. Yes, sir; the basic civil air regulations with respect to that.

Mr. HINSHAW. The basic civil air regulations for pilot training?

Mr. CHAMBERLAIN. That is correct.

Mr. HINSHAW. Are they any different for scheduled carriers than for nonscheduled carriers?

Mr. CHAMBERLAIN. I would have to refer to the two parts here to give you a precise answer. I think it is safe to say that they are not essentially different. The rules with respect to pilot training in the present parts are somewhat general and objective in nature, and give the Administrator of Civil Aeronautics considerable authority and responsibility for determining that the carriers have, in the particular case, adequate training programs, and have carried them out.

In connection with a complete revision of the air carrier operating regulations, which we have been engaged in during the last year or more very intensively, we are proposing to considerably amplify the specific regulations with respect to certain elements of pilot training, feeling that it needs more emphasis.

But I think it is safe to say that generally speaking, the training requirements are set up in such a way that they should achieve equality between the two types of operations.

Mr. HINSHAW. Then your regulations in that respect are entirely closed as between the certificated and the noncertificated carriers; is that correct?

Mr. CHAMBERLAIN. I think that is a fair statement, sir.

Mr. HINSHAW. And do they go into any detail, or are they general, merely authorizing the Civil Aeronautics Administrator to set up pilot training courses?

Mr. CHAMBERLAIN. At the present time, as I mentioned, they are rather general, and authorize the Administrator to see that the carriers have set up pilot training programs which are realistic and commensurate with the type of operation they have, the type of equipment they operate, and so forth.

Considering the variability of proper training programs, with the variability of the operations which we have throughout the country, and for international operations, it has been considered in the past somewhat improper to go into too much specific detail in the basic regulations.

Mr. HINSHAW. Would a part of those regulations be such as to require careful training of pilots, for example, in the event that one of two engines went out on take-off or on landing?

Mr. CHAMBERLAIN. I would have to refer to the specific requirements, sir, to make sure of that. I would say offhand that the requirements in the Board's regulations are not too specific with respect to that. That is one element, incidentally, which we are specifying, paying more attention to, in this current revision which I just mentioned. That revision, incidentally, should be before the Board in the matter of the next few weeks for final adoption, and presumably would eventually be the same, probably identical, for both irregular and scheduled.

I can read the section here if the committee would wish. This is the one in part 42, for irregular carriers, 42.45, "Proficiency of crew members serving on large aircraft." Large aircraft are defined by the Board as those above 12,500 pounds.

> The air carrier, by means of a training program, or otherwise, shall insure that crew members are proficient in their duties and are kept currently informed of all techniques and new developments pertinent thereto. The program shall include instruction in emergency procedures and in crew coordination.

Then the Administrator carries on, in his material, in a little more detailed fashion.

Mr. HINSHAW. The CAA then goes into the question of whether or not that training program is adequate.

Mr. CHAMBERLAIN. Is adequate for their operations, their equipment, and so forth; that is correct.

Mr. HINSHAW. I think, if the chairman has no objection, I would like to ask a question or two about the DC–6, if you feel that you can answer them.

Mr. CHAMBERLAIN. I will try to, sir. I am not sure I am equipped to do that.

Mr. HINSHAW. Well, thinking of the DC–6, and its take-off characteristics, what are the requirements in the transport category for take-off of a four engine aircraft with one engine out and two engines out?

Mr. CHAMBERLAIN. There are no take-off requirements in the transport category for two engines out. The requirements are specifically addressed to the condition of one engine out. And they require, as I mentioned earlier in my testimony, I believe, that at any point beyond this critical engine failure speed, after which the pilot, having lost an engine as we say, elects to continue with the take-off, he can go ahead then and take off at the speed which is called the take-off safety speed, have a positive rate of climb, while he is retracting the landing gear, and then while he is feathering the propeller, and the requirement increases somewhat in those different configurations.

That is with one engine inoperative. It does not require it for two engines inoperative.

Mr. HINSHAW. There is no such requirement?

Mr. CHAMBERLAIN. There is one requirement with respect to continuation of operation en route, for the longer range flights, with respect to two engines inoperative, but there is nothing with respect to performance in the take-off area.

It was considered to be such a rare occurrence, and unrealistic, to require performance capabilities in the take-off regime with two engines out.

Mr. HINSHAW. Have you any idea as to what would happen to an airplane of that type in the event that two engines failed at a speed which it is airborne?

Mr. CHAMBERLAIN. I think, sir, that would depend upon the particular airplane. I am sure it would, depending upon its particular weight and its excess of performance over the required minimum performance in the regulations. I couldn't give any sensible estimate as to what the actual performance of a particular airplane might be under those particular conditions in the take-off regime. Perhaps the CAA people can do that.

Mr. HINSHAW. Perhaps for the record, you can assert the expected rate of climb with single-engine out and feathered propeller and landing gear retracted after the critical stage, or at the critical stage, which I presume would be at the time of retracting the landing gear, the spilling of the flaps, and feathering the propeller.

Mr. CHAMBERLAIN. The critical stage would be before those, of course.

Mr. HINSHAW. Well, whatever it is.

Mr. CHAMBERLAIN. The airplane is in the maximum drag condition, with the landing gear still down, the propeller unfeathered, and the flaps in take-off condition.

Mr. HINSHAW. I think we should know what the expected characteristics are for that airplane with the load close to the maximum. I think the maximum is 86,000 pounds or thereabouts.

Mr. CHAMBERLAIN. It is approximately that for the DC–6, I think.

Mr. HINSHAW. Yes; and if there are any ideas as to what the two remaining engines would pull in the event the two starboard or port engines went out, we would be interested very much in that too, just what should be expected of the aircraft in that condition. That, of

course, approximates perhaps the condition that existed here quite recently. We would like to know what the expected characteristics would be.

Mr. CHAMBERLAIN. We will be happy to try to get some computations on that for you, sir.

(The information referred to is as follows:)

With 20° take-off flaps, and wheels retracted, at a weight of 84,000 pounds, the DC-6 would have a rate of climb of 90 feet per minute with 2 engines feathered, or a rate of sink of 60 feet per minute with only 1 engine feathered and the other inoperative with the propeller windmilling.

With 0° take-off flaps, wheels retracted, at 84,000 pounds, the DC-6 would have a rate of climb of 190 feet per minute with 1 engine feathered and the other windmilling.

Both these cases assume the other 2 engines to be operating at take-off power.

Mr. HINSHAW. And, as you have some very good aeronautical engineers, I would be interested and I am sure the committee would be interested to know what would be expected of an airplane which was coming in for a landing, an airplane certificated in the transport category, as well as one in part 42, or section 42, in the event, let us say, one flap spilled without the other one spilling. I don't know what would happen, myself, but perhaps you people can figure that out and give us some idea.

Mr. CHAMBERLAIN. I don't think the situation would be very desirable.

Mr. HINSHAW. I am sure it would not, but I am just curious to know what an aeronautical engineer's idea would be in that respect, without reference to anything in particular.

Mr. CHAMBERLAIN. I would be happy to see if we can get some speculation on that point, sir, or something more specific.

We will have to take the particular airplane, because it would vary vastly with the particular type of flap in an airplane.

Mr. HINSHAW. There are several other things we might want to know, but we do not want to speculate too far.

(The following information was furnished in reply to Mr. Hinshaw's question:)

In reply to the question of what would happen if an asymmetric wing flap configuration occurred on any representative transport-type airplane, the following hypotheses, with their conclusions, are offered:

(1) If only one flap were extended to the landing position, complete loss of control would ensue.

(2) If only one flap were retracted from the landing position, complete loss of control would ensue.

(3) If only one flap were extended to the approach position, complete loss of control would ensue.

(4) If only one flap were retracted from the approach position, complete loss of control would ensue.

NOTE.—If flap symmetry could be immediately regained as soon as the pilot became aware of the asymmetric flap position (i. e., before complete extension or retraction was effected), control could probably be retained.

(5) If only one flap were extended to the take-off position, control could probably be maintained, but an emergency flight condition would exist.

(6) If only one flap were retracted from the take-off position, control could probably be maintained, but an emergency flight condition would exist.

It should be noted that the transport category regulations require that wing flaps be mechanically interconnected (to preclude asymmetric flap positioning) unless flight demonstrations show that satisfactory control can be maintained with the most unsymmetric flap positioning. In this respect, no transport airplanes have ever demonstrated the alternative requirement, but have designed mechanical interconnections in every case.

Mr. BECKWORTH. Mr. Wolverton has a question.

Mr. WOLVERTON. I am aware of the great care that you observed in fixing regulations that will promote safety. Does it come within the jurisdiction of your Bureau, or some other, to ascertain whether the regulations are complied with before a plane leaves the ground?

Mr. CHAMBERLAIN. No; it does not come within the jurisdiction of my Bureau, nor does it come directly within the jurisdiction of the Civil Aeronautics Board, because the Board is the regulatory agency here in Washington, and does not have a field force to enforce the regulations or administer them. The only field force the Board has is its accident investigation staff, which is a rather small one.

The CAA, Civil Aeronautics Administration, would normally perform the function to which you refer, I believe, sir.

Mr. WOLVERTON. The reason that I asked the question: I read, as I came down here today, a newspaper report allegedly given by a spokesman for either CAA or CAB, probably the former, in which a question was raised as to the type of gasoline that had been used on this last flight that we are investigating. The thought was expressed by someone that it may have been of a lower grade, from an octane standpoint, than regulations required.

I assume from that that you do have regulations that fix a particular octane degree for use in these airplanes.

Mr. CHAMBERLAIN. No, sir. The regulations themselves are not specific on a point of that nature. However, in the certification process, through which CAA goes, in getting the planes certificated for operating, the required minimum octane of the fuel and other pertinent specifications of that nature would be specified in the pertinent documents for the airplane and would thereby become in effect the regulations that would have to be followed. That type of thing, however, is not specified in the Board's regulations because of the infinite variability from plane to plane.

Mr. WOLVERTON. Does it occur to you that there should be some regulation on the subject as well as the certification, or do you consider the latter to be sufficient?

Mr. CHAMBERLAIN. I think, sir, the latter is sufficient; and I think our regulations would become exceedingly unwieldy if we tried to incorporate into the basic regulations other detail of a comparable nature.

I think the regulations would become exceedingly bulky in order to cover the variety of such conditions that are permissible and fully safe. I think it is not the proper function of basic Government regulations to go into that type of detail. I think the present system is workable, and I think that there are probably very few cases of record where such a thing has occurred, if in fact it did occur in this case.

Referring back to your first question, if this type of thing occurs or is reported to have occurred in connection with a particular accident, the Board, the Civil Aeronautics Board, in its investigation of that accident will go into that particular thing very thoroughly. If it is merely an incident not in connection with an accident that occurs some place in the field CAA would normally be the one to come into possession of it first.

Mr. WOLVERTON. It would seem to me that if it is a matter that is considered in the granting of the original certification, it must be

looked on as having some bearing on the question of safety. And if such is the case, then it would seem to me to be appropriate that some agency of the Government would concern itself as to whether that regulation or in this case certification of the required type is complied with.

In this particular article to which I refer there is a statement that is supposed to have come from an alleged statement of a Government agency, and it was said that while they did not think that that had been the case in this instance, as there had been other planes fueled from the same storage, I assume, they did not think that it did have a bearing in this case, but nevertheless it was a matter that was being looked into.

I think they went on to say that it should have had 100-octane gas, and it might have had only 90, and they looked upon it as of sufficient importance to state that that matter would be inquired into.

Mr. CHAMBERLAIN. I certainly agree that that might be of very great moment with respect to safety. However, there are almost an infinite number of other things that would be equally important to safety, which are by their very nature variable from airplane to airplane, or in different parts of the country, for example, and in order to cover adequately all of that type of thing in the basic civil air regulations we would have to have a tremendously unwieldy document, I think, which would tend to lose a lot of its basic effectiveness as general regulations.

Mr. WOLVERTON. You do fix, in your certification, the degree of octane that is to be used by that particular plane and the gas or fuel that it utilizes?

Mr. CHAMBERLAIN. No, sir; we do not.

Mr. WOLVERTON. Then I misunderstood.

Mr. CHAMBERLAIN. No, sir, we do not fix that specifically. We have general requirements that indicate that the airplane must be operated in accordance with all of the operating limitations and specifications that CAA determines are necessary when they certificate the airplane. And the fuel required, the type of fuel required, is one of the elements that CAA determines in their initial certification of the airplane, and they specify it in their documents.

Mr. WOLVERTON. If that be true, I come back to the thought that I had, that it must be an important element.

Mr. CHAMBERLAIN. It is.

Mr. WOLVERTON. And therefore I would assume that there would be some examination or inspection made to ascertain whether the plane was meeting that particular requirement.

Mr. NUNNELEY. May I address myself to that? My name is Nunneley. I am general counsel of the Board.

Mr. WOLVERTON. Yes.

Mr. NUNNELEY. In the first place, I am not sure we have made clear the fact that the carriers are required to operate their aircraft in accordance with the specifications, including the fuel specification, so that if they fail to do so they would be in violation of the legal requirements.

Secondly, it is certainly clear that any such violation would be a matter of interest in two respects: (1) from the Civil Aeronautics' Board's standpoint, as to whether that was a matter contributing to or a cause of the accident, and (2) from the standpoint of the CAA, as

the inspecting and enforcing agency, as to whether there had been a violation of the lawful requirements. So that both the CAA and the CAB in this instance would clearly address themselves to that problem among the many others that arise in connection with this accident.

Mr. WOLVERTON. It would seem to me appropriate to remark that to make investigation, after an accident, as to whether such violations had occurred is sort of locking the door after the horse is gone. I would assume that if it is important that the engine and all that goes into the operation of the airplane is inspected, certainly that would be true as to the type of gas. Because, after all, that is the foundation of the movement of the plane.

Mr. NUNNELEY. I believe it is important, Congressman Wolverton, and in addition to that I am sure that the CAA inspectors, their field force, are alert to that problem, and to the necessity of making appropriate inspections to see that those requirements are being observed, as well as the various other requirements that would be applicable. That is a daily continuing function, field function, which the CAA performs without waiting for an accident. The reason I made reference to the existence of an accident is that it is at that point that the Board and its investigative functions with relation to the accident came into play.

Mr. WOLVERTON. In the event it should be determined—and I do not want my question to indicate that such is of very great likelihood, judging by the article I read, yet if it should be found that it was of a lower grade than had been required in granting the certification, what if any action could be taken against the company in the absence of regulation on the subject?

Mr. NUNNELEY. Well, there is not an absence of regulation, Congressman.

Mr. WOLVERTON. Someone said a moment ago that to make regulations would require such a voluminous document that it not be practical.

Mr. NUNNELEY. That is the point on which I thought there was some confusion.

These requirements are not put in the Board's Civil Air Regulations themselves. They appear in the specifications for the aircraft, which are determined and issued by the Administrator. The regulations require that planes be operated in accordance with those specifications. So in effect, there is a legal requirement that such specifications be observed.

Mr. WOLVERTON. Then, if it is necessary to reframe my question, what procedure would be taken if it were shown that they had not complied with that specification in this particular instance?

Mr. NUNNELEY. The procedure would be this: It is the function of the Civil Aeronautics Administration, through their safety agents and counsel, to examine the situation, and if it is determined that there has been a violation, there would be available to the CAA two courses of action.

First, the CAA could undertake to collect a civil penalty from the company for the violation, or, second, if the violation were of a seriousness that warranted such action, the CAA could file a complaint for suspension of revocation of their air carrier operating certificate. The course of action would be determined in view of all the circumstances, the seriousness of the violation, whether it was done knowingly or willfully or not, and whether it represented a course of action

or a single incident. Those are facts which I assume the CAA would take into account. A complaint for suspension or revocation would be filed by the Civil Aeronautics Administration with the Civil Aeronautics Board if the former determined upon that course.

Mr. WOLVERTON. Then in your opinion the absence of any particular regulation would not handicap the CAA in proceeding in a manner commensurate with the harm that has come as a result of the failure to do the thing that was required of the company to do in the certification of the plane?

Mr. NUNNELEY. No, sir. If the CAA determined that the company had failed in its duty to use the appropriate gasoline, and they felt that that was a serious and willful violation, they could bring an action. Under the Civil Aeronautics Act the Board may suspend if it finds that the public interest so requires.

Mr. HINSHAW. Or may revoke.

Mr. NUNNELEY. Yes. The standards are a little different for revocation. We may revoke for any cause which would warrant refusal to issue a license in the first instance.

Mr. WOLVERTON. Well, with or without regulation, but having in mind the importance of the requirement that you make in granting the original certification, does it seem to you that there should be some inspection of that matter before a plane takes off?

Mr. NUNNELEY. Well, if I may, I would like to ask the Civil Aeronautics Administration to answer the question as to the extent to which regular inspection of that kind of item is deemed necessary in the case of a responsible operator.

I assume it would not be required in the case of every take off.

Mr. WOLVERTON. Is there a person present whom you would like to have answer that question instead of yourself?

Mr. NUNNELEY. Yes. Mr. Hensley of the CAA.

Mr. WOLVERTON. Mr. Hensley, could you answer that question? In other words, what, if any, inspection is made as to the type of gas that a plane has before it takes off?

Mr. BECKWORTH. And will you state your full name, Mr. Hensley, for the record.

Mr. HENSLEY. E. S. Hensley, Director, Office of Aviation Safety, CAA.

Mr. Chairman and Congressmen, to go back just a little bit, we do determine the octane rating of the fuel to be used by the engine at the time it is issued a type certificate, or the official approval.

Now, to review it just a little, we do not feel it is restrictive in any way when the octane rating of fuel for any given engine is not specifically specified in the rule. It is simpler, considering the size and horsepower of the engine, and the specifications under which it is to be operated, to agree with the manufacturer at the time the tests are made on the proper octane rating for the fuel. Now, that is a part of the operating specifications. And any operation of the engine other than in accordance with those specifications is, of course, in violation.

Now, specifically, we do make semiannual field and equipment inspection of all of the air carriers, as a routine thing. That is done semiannually, during which time the fueling facilities are checked and determined to be in accordance with the rating used by the carrier for that equipment being operated.

Mr. WOLVERTON. Mr. Hensley, the thing that I am interested in is not an examination of facilities. I am interested from the standpoint of whether, before this plane took off, it was the duty of any inspector from your department or the Bureau or any other to examine to see the type of gasoline that that plane was using.

Mr. HENSLEY. No, sir, I would not consider it to be a specific duty for the particular or individual flight. Now, I say that because it is just an impracticability to have sufficient people to measure and insure that each flight prior to take-off is fueled with the proper octane of fuel.

Mr. WOLVERTON. Would it be possible by the use of a lower octane degree than that which had been recommended by the manufacturers of the plane and your own examination to have caused an accident?

Mr. HENSLEY. That is rather difficult to answer. I would rather have someone more qualified than I to answer that specifically.

Mr. WOLVERTON. I am not a technical man. I am just trying to use some degree of common sense.

Mr. HENSLEY. Yes, sir.

Mr. WOLVERTON. So that if the manufacturer has specified a particular degree of octane gas to be used by that engine in order to promote efficiency, and if the CAA is agreed that that is right, and it is made a part of the specifications on which the certification of that plane is made, that, to me, indicates that it must be important. Now, if it is important enough to make it a specification, then it would seem to me that it would be important enough to see whether, and by inspection, that type of gas is being used or not, on each flight.

Mr. HENSLEY. That is correct, sir. I agree with you.

Mr. WOLVERTON. Because if it is true that an accident could happen as a result of a lower degree than should have been used, then it is highly important to make certain, for the safety of those passengers, in this case those on the ground as well, whether they are living up to that specification or whether they are bypassing it.

Mr. HENSLEY. Congressman, I agree with you wholeheartedly. It is, I think, a matter of common sense and, shall I say, a sharing of responsibility. Now, the carriers obviously have the responsibility and are just as interested in conducting a safe operation as we are. And it is the responsibility of the carrier, as it is of the Government, to insure that the proper specification of gasoline is in the fuel tanks of the aircraft.

Mr. WOLVERTON. There is no doubt of the responsibility that exists upon the part of the air carrier to fulfill the specifications in every particular. But I am raising the point that the accident could happen upon a failure on their part to do so, as has been indicated might be the case, in using a lower degree of octane gas, and then it seems to me, in a matter of that importance, and the ease with which I would think it could be done, to ascertain whether that proper degree of octane is contained in the gas that is being used for that engine in that particular flight.

Mr. HENSLEY. Well, sir, I am sure that that is being ascertained to the satisfaction of the company and the people in the company responsible for both acquiring and maintaining the tankage and subsequently fueling the aircraft with the proper grade. Now, we do make periodic checks of the companies' operations to see that their

responsibility is being carried out. But I do say that it is rather impracticable to have CAA agents at so many points make personally a physical check of that just before each take-off of the aircraft.

Mr. WOLVERTON. Well, probably it could be done by a requirement of certification of the gasoline when it is delivered at the airport.

Mr. HENSLEY. It is, sir.

Mr. WOLVERTON. So that it is your opinion that in this case, and I do not want to prejudge it or preclude you from any additional evidence, the fuel then that was used had been inspected when it was put on that field for use?

Mr. HENSLEY. I would be inclined to say that it was, yes, sir. And both by the furnishing company, meaning the gasoline company, and the receiving company, the carrier.

Mr. WOLVERTON. I will be interested to know whether there is anything in this point which has been raised which was the basis of the article which I read today.

Mr. HENSLEY. I am sure we would all be interested in that, too.

Now, I might just give you my personal opinion. You mentioned 100-octane gas as being required, yet the report stated that it might have been fueled with 90 octane; which, in my opinion, would only make a reduction in the power available to the engines, and would not cause the engines to fail in any way.

Mr. WOLVERTON. I do not know enough about it to agree or disagree with what you say in that respect. I have to base my thought entirely upon the fact that a specification was given by the manufacturer and by the CAA as to what that plane should have, and assuming that in doing that you did it for protective purposes.

Mr. HENSLEY. Yes, sir. It is for the purpose of insuring that the proper grade of fuel is there to deliver the rated amount of power. Now, there are grades of gasoline that will reduce or increase the amount of power taken from the engine, but to reduce it to the point of failure of the engine it has to be a considerably lower grade of gasoline than is prescribed for the engine.

Mr. BECKWORTH. Let me ask you this: Could the flight fail without the complete failure of the engine?

Mr. HENSLEY. I would like to ask you for a little elaboration on that.

Mr. BECKWORTH. Well, I do not think it requires much elaboration.

If your engine continually functioned, except that the power it was developing was far below what it should be, is it conceivable under some circumstances that that would cause the flight to fail?

Mr. HENSLEY. You mean the gasoline——

Mr. BECKWORTH. Ordinarily I think of engine failure as a time in the operation of the engine when it quits working. There is a difference between that and a time when it is not developing nearly enough power.

Mr. HENSLEY. You mean that the gasoline loaded in the aircraft was so inferior that sufficiently less power was delivered to make flight impossible?

Mr. BECKWORTH. Could you conceive of a plane being weighted to a point, and the gasoline in the motor being such that finally it just could not make it? That is a technical question, but I am just asking if it was impossible. I just do not know.

Mr. HENSLEY. I wouldn't say it was impossible. I would say it was highly improbable to have an aviation grade of gasoline that would reduce the power to the extent that you could not maintain flight.

Mr. MACK. I think Mr. Beckworth brought up a good point there, because if you had an engine with a low grade fuel, it would be very difficult for the remaining engine or engines to provide the desired rate of climb from that point on.

Mr. HENSLEY. I have to agree with you, sir, if the reduction in the power available to the propeller by the use of inferior gasoline, or gasoline of a lower grade, is appreciable, yes. Now, the farther you reduce it, obviously the less power is available, the more sluggish your airplane, and the less performance there would be there.

Mr. MACK. And in line with what Mr. Wolverton was discussing, are most of the scheduled airlines in the gasoline business, or are they supplied by someone else at the various airports?

Mr. HENSLEY. Are they supplied by someone else?

Mr. MACK. By one of the major oil companies at the airport, or do they have their own storage tanks and their own delivery trucks to deliver the gasoline that is on the ramps of the airport?

Mr. HENSLEY. Sir, I believe the arrangements on that are so varied that there is no pattern. Many places I do know the companies maintain their own facilities furnished from the bulk station of the oil company, and I know in other cases the oil companies provide the service right to the aircraft.

It depends largely, I am sure, on the facilities that are available at the airport in the way of tankage or tank farms that might be available nearby. It is done in various ways.

Mr. MACK. I was under the impression that most of them had contracts with the major oil companies to furnish it from the oil company facilities on the ramp.

Mr. HENSLEY. I would be inclined to say that such was the arrangement most commonly in use. For one reason, I would think it would relieve the air carriers of the trouble of maintaining the equipment.

Mr. MACK. You mentioned that you do check the facilities at various airports.

Mr. HENSLEY. Yes; we have a facility check of the carrier each 6 months. That is a required check semiannually.

Mr. MACK. And it would not be any different if they were purchasing from an oil company, to find the octaine rating of gasoline furnished at the particular time? For instance, if you wanted to find the octane rating of the gasoline that went into a particular airplane, you could probably find that by going to the particular supplier.

Mr. HENSLEY. That would be the method of doing it. We have no means ourselves of checking the octane rating.

Mr. MACK. I would think that would be a local responsibility, to check the octane ratings.

Mr. HENSLEY. That could be. Our responsibility, we feel, is in checking with the oil company and with the carrier to insure that they are in fact delivering and using the proper rating of fuel for their equipment.

Mr. MACK. You do check that?

Mr. HENSLEY. Yes, sir.

Mr. MACK. In addition to that, I think that in most States in our country they have State petroleum agencies that check the storage tanks and periodically check the octane rating of the gasoline.

Mr. HENSLEY. That is a matter of checking the actual fuel itself. Ours is one of checking to see that the proper fuel, without inspecting or testing the fuel itself, is supplied, that the proper deliveries of fuel are made to the carrier and that the carrier uses that fuel for the equipment he has in service.

Mr. MACK. And you check that by means of looking at their records, invoices?

Mr. HENSLEY. Yes, sir.

Mr. WOLVERTON. I am of the opinion that mere checking of invoices of itself would not cover the situation.

If he had a contract to supply a particular grade of gasoline, I would assume that the invoice would comply with the contract.

I am going a bit further than that, to know whether the product actually coincides with the invoice in the requirements.

We are all familiar with the fact, without directing criticism to any particular company or individual, that very frequently specifications in a contract are not lived up to as fully as might be expected. And I am just wondering if situations at times would make it possible that a lower grade than that which was expected to be delivered was in fact delivered for use. Maybe I have attached too much importance to this. It sort of grows in my mind as a result of the article that I read just today on that subject.

Mr. HENSLEY. Well, sir, we don't minimize the importance of it, either.

I will have to admit that it has not been our practice to confer with the State testing agencies on the fuel products within those States.

I will look into the possibility of including that additional check with the petroleum company to see that their examinations of the fuel stored in the tank show that it is of the right octane rating or is up to the specifications for that.

We can easily include that as a matter of routine examination of the facilities when we make these checks. It is probably a good point.

Mr. BECKWORTH. The committee will adjourn until 2 o'clock tomorrow afternoon. We will continue on the same subject tomorrow.

I think it would probably be well for you to come back, since we are rather working both divisions, CAA and CAB, at the same time.

(Whereupon, at 4:55 p. m., the hearing was adjourned until 2 p. m., Friday, February 15, 1952.)

AVIATION SAFETY

FRIDAY, FEBRUARY 15, 1952

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE OF THE COMMITTEE ON
INTERSTATE AND FOREIGN COMMERCE,
Washington, D. C.

The subcommittee met at 2 p. m., Hon. Lindley Beckworth (chairman) presiding.

Mr. BECKWORTH. The committee will please be in order. When we adjourned on yesterday the chairman was testifying. It is my understanding Mr. Hinshaw has some questions he wishes to ask about some accidents that occurred to the C–46's. If you will take the stand, Mr. Hinshaw will ask you some questions.

STATEMENT OF JOHN M. CHAMBERLAIN—Resumed

Mr. HINSHAW. On yesterday, Mr. Chamberlain, in the course of discussing accidents that had occurred to C–46 aircraft, you mentioned that there were a few accidents or several accidents—I do not remember which—which had occurred to C–46 aircraft as the result of the failure of one engine. I wish, Mr. Chamberlain, you would give us a brief statement about those accidents; how many there were, and so forth; and the relationship that that number bears to the total number of serious C–46 accidents, and any other information which you have.

Mr. CHAMBERLAIN. Mr. Chairman, I have several documents here in the form of accident statistics which were furnished me this morning by Mr. Andrews, Director, Bureau of Safety Investigation, which material I believe has been available heretofore. The one document here is entitled, "Summary of C–46 Accidents Which Involve Inability to Maintain Altitude on Single Engine Following Engine Failure During Takeoff Climb." That is dated October 1, 1951, and was prepared by the Bureau of Safety Investigation of the Board, I believe at that time to be introduced as factual evidence in the Board's public hearing in connection with the proposed rule making for the C–46 airplane.

This covers nine accidents some of which there have been formal board reports issued on and others which are merely based on the evidence in the Board's accident investigation records.

In those cases there are no conclusions drawn in this report. This is merely a very brief presentation of factual evidence and if you wish me to read this in detail, I shall.

Mr. HINSHAW. Mr. Chairman, in view of the fact that the committee does not have individual copies of this document for its own

perusal and in view of the importance of the matter, I think it well that the gentleman read it, if that is the pleasure of the committee.

Mr. BECKWORTH. You may proceed to read it, Mr. Chamberlain.

Mr. CHAMBERLAIN. Incidentally, we can furnish additional copies of this if the committee wishes, a t a later time. It is as follows:

ACCIDENT NO. 1

This accident occurred at Asmara, Eritrea, Africa, on January 26, 1949 (Alaska Airlines). Acceleration and power was normal until gear was retracted, at which time the right engine power dropped to about 70 percent and continued dropping as flight continued. Air speed dropped from 95 to 80 miles per hour. In an effort to remain airborne, estimated altitude 50 to 75 feet, flight was sustained with full throttle setting and full r. p. m. on both engines—No. 1 was putting out 50 to 70 percent of its power. After completing about 270 degree turn, runway 120 degrees was located, gear was dropped 10 seconds before contact with the ground some 200 feet short of the flield on a heading of about 090 degrees.

Runway length	feet	6,300
Elevation	do	7,628
Weight on take-off	pounds	42,250

"NOTE.—CAA report states that there was some question as to whether aircraft was overloaded in view of the 7,628 feet elevation. The airplane manual does not cover performance specifications above 6,000 feet or loads less than 45,000 pounds. The determination as to whether the aircraft was overloaded or not could not be determined at Asmara, according to the CAA report.

Asmara at the time was the main service base for Alaska Airlines operations, Aden to Lydon. Maintenance superintendent reported that engines were in "top shape." A No. 1 check had been accomplished 5 hours flying time prior to the accident, and it was stated that preflight inspection was made the evening prior to this flight; and that both airframe and engine time were low.

Engines were checked following accident. Main fuel screens were removed and found clean. The carburetor fuel screen was removed and found to contain what was believed to be chamois lint.

ACCIDENT NO. 2

This accident occurred at Seattle, Wash., on July 19, 1949 (Air Transport Associates.) The aircraft rolled some 3,500 feet down runway 31 (7,500 feet long), then became airborne at an air speed of 105 miles per hour. During the run, one of the engines was heard to sputter and backfire, and an unusual amount of torching or exhaust flame was observed coming from both of the engines. Because the left engine did not seem to be developing full power, the captain, at an altitude of some 20 feet retarded the throttles and the aircraft settled back to the runway. At the time of the accident the green threshold lights at the north end of the runway (31) had been moved in 1,700 feet for runway repair purposes, in effect reducing the length of the runway to 5,800 feet. However, this north portion of the runway was usable for take-off. After touching down on the runway, approximately 4,500 feet from the start of the take-off and 1,300 feet from the green threshold lights, the captain did not believe that he had sufficient runway to accomplish a safe stop, so he advanced the throttles to the limit of 52 inches, both engines responded, but the left continued to misfire. After a momentary ground roll the aircraft again became airborne at an air speed of 105 miles per hour. Landing gear was retracted, air speed increased slowly to approximately 110 miles per hour, and the flight continued over the north end of the runway at about 50 feet above the ground in a nose high attitude. Sufficient altitude could not be obtained to fly over power lines and poles to the north of the airport, and 1,500 feet north of runway 31 the aircraft struck a 56-foot pole two feet below its top. A second pole, 1,480 feet from the first, was struck, then a third pole 200 feet from the second. As a result, air speed and altitude were lost, and 200 feet from the third pole the aircraft crashed into a three-story house.

Investigation disclosed, among other things, that 91 octane fuel was used for run-up on the ground and for the take-off with the engines operating on the front main tanks. The aircraft was certificated under a specification which provided only for the use of fuel of 100 octane rating or above.

The probable cause of this accident was determined to be the indecision of the pilot in continuing a take-off after loss of power in the left engine, which loss was probably caused by the use of 91 octane fuel, necessitating the operation of the aircraft's engines in excess of the approved operating limitations.

Runway length	feet	7,500
Elevation	do	15
Weight on take-off	pounds	44,907
Allowable limit	do	45,000

ACCIDENT No. 3

Crashed in the Atlantic Ocean 6.4 statute miles west of Isle Grande Airport, San Juan, P. R. (Strato Freight, Inc.) Of the 75 passengers and crew of six aboard, 52 passengers and one crew member lost their lives.

	Pounds
Weight on take-off	48,709
Allowable limits	45,000
Excess	3,709

One minute after the aircraft left the ground, and at an indicated air speed of approximately 115 miles per hour and at an indicated altitude of 250 feet, mean sea level, the right engine began to backfire severely and lose power. No attempt was made to feather the right engine. An emergency was declared, and the tower cleared the flight to land on runway 9. But, since air speed was low and altitude could not be maintained, the aircraft was flown straight ahead for a crash landing 200 yards off the shore at Punta Salinas.

Disassembly of the right engine disclosed, among other things, that 30 of the 36 spark plugs were type AC–LS–87 spark plugs which were not approved by the manufacturer of the engines, or by the United States Air Force, for use in the engines which were installed in this aircraft. Furthermore, the spark plug terminals for this engine were found to be oily and dirty and spark plug electrodes were found to have too much clearance.

Following failure of the right engine, the aircraft failed to remain airborne despite the fact that the left engine was apparently developing full power, because the aircraft did not have single engine climb speed and its gross load was 3,709 pounds more than the certificated weight. Other factors contributed to this lack of single engine performance; the right propeller was not feathered, and the right cowl flaps were fully opened and the landing lights were extended, all of which would materially increase the parasitic and interference drag.

The probable cause of this accident was the loss of power of the right engine before the aircraft attained the optimum single engine climb speed which, together with the overloaded conditions of the aircraft, resulted in its losing altitude and falling into the sea.

Mr. WOLVERTON. Was there any reference in that report to the type of gasoline?

Mr. CHAMBERLAIN. I believe not, sir. It refers to the improper gasoline in the preceding accident. There was none in this one.

ACCIDENT No. 4

Crashed about one-half mile from the Teterboro, N. J., airport shortly after take-off on May 27, 1950 (Regina Cargo Airlines). The captain was fatally injured and the copilot received serious injuries.

Weight on take-off	50,076 pounds
Allowable limits	45,000 pounds
Excess	5,076 pounds
Runway length	4,500 feet

At an altitude of some 200 to 300 feet mean sea level, the left engine started to misfire. The landing gear had been raised and was checked for position. The left engine continued misfiring and shortly became worse. The left propeller was feathered. Full power was maintained on the right engine and a left turn was started as if to return to the airport. At this point the altitude was estimated to be 400 to 500 feet. During the turn the air speed fell to 85 to 90 miles per hour and the aircraft settled. This turning continued until the aircraft neared the ground, when it was leveled laterally. It struck while about level.

Upon inspection, the ignition system of the left engine showed abnormalities. The spark plugs of this and of the right engine were of an approved type for this model engine. Four of the 36 spark plugs of the left engine proved defective inasmuch as they fired either irregularly or not at all when tested in the condition in which they were removed from the engine. Furthermore, five other spark plugs exceeded the specified limits when tested for gas leakage. Company records indicated that these spark plugs had been in service for 92 hours and 55 minutes, which is 67 hours and 5 minutes less than the maximum allowable amount.

Examination of the right engine disclosed a number of ignition abnormalities but to a lesser degree than in the left engine.

The best single-engine speed of the aircraft, with a maximum gross weight of 45,000 pounds, according to company's operations manual, is 125 miles per hour. At a gross weight of 50,000 pounds, this speed would be somewhat increased. At the time the left engine malfunctioned and was feathered, the air speed had reached an estimated 130 to 135 miles per hour.

The sustained misfiring of the left engine and the subsequent feathering appears to have resulted from the additive effects of three factors: (1) the condition of the spark plugs, the abnormally wide range in the gaps of the spark plug electrodes which indicate that the plugs had been improperly gapped, and thus excessive erosion occurred prior to the normal replacement period of 160 hours; (2) the condition of the magnetos—the breaker points of both magnetos were burned and oily and the magnetos were improperly timed. (Thus, it is evident that both of these accessories were in a poor state of maintenance. Their accumulative effect apparently caused irregular firing.); (3) under take-off conditions when manifold pressure was greater than that used during the run-up, as is normally the case, this misfiring would become more accentuated.

As far as the right engine is concerned, there is no evidence to indicate any power interruption from the time of take-off until the crash, although its condition indicated marginal maintenance.

Probable cause: Overloading of the aircraft due to faulty loading and dispatch procedures, coupled with engine malfunctioning due to inadequate maintenance.

ACCIDENT NO. 5

Preliminary data only available at this time. Accident occurred at Chicago, Ill., on September 16, 1951 (Peninsular Air Transport). Left engine backfired and lost power during take-off—altitude some 200 feet and air speed about 105 miles per hour—propeller was feathered. Unable to maintain altitude on one engine. Investigation disclosed insufficient number of threads in the spark plug bushing to hold the newly installed plug properly. Also due to erosion a leak existed which caused overheating of the plug. The plug points fuzed and pre-ignition occurred. Preliminary evidence indicates that the aircraft was overloaded by some 1,000 pounds.

Summary of take-off accidents: No engine failure.

Mr. HINSHAW. That is five accidents on account of engine failure?

Mr. CHAMBERLAIN. That is right.

Mr. HINSHAW. The next are a result of what?

Mr. CHAMBERLAIN (reading). "Summary of Take-off Accidents—No Engine Failure."

I am sorry; when I read the title I thought it referred to the nine accidents. The five accidents I have just read involve engine failure sometime during the take-off or in the ensuing climb. The following ones apparently involve no engine failure.

ACCIDENT NO. 6

This occurred on September 30, 1948, at Basra, Iraq, and involved Skyways International Trading & Transport Co., Inc. Failed to become airborne, no engine failure.

Weight on take-off	pounds	40,040
Allowable limits	do	45,000
Runway length	feet	6,000

Incidentally, do you wish me to continue with these, even though they do not involve engine failures?

Mr. HINSHAW. It would be interesting to know what caused the failure.

Mr. CHAMBERLAIN (reading):

Take-off made in hot, still air conditions. Inadequate flight preparations, and inadequate maintenance. Primary cause of accident stated to be misuse of brakes and flight controls on ground.

I might add at this point that this is very brief. Obviously it was not an accident that was investigated, due to the location and the relative importance of this particular one.

ACCIDENT NO. 7

This accident occurred on July 30, 1950, at Denver, Colo. (Flying Tiger Line). Calm conditions. Left ground, settled back in, then became airborne within few feet of runway end, and then struck a power-line pole, 1,900 feet from end of runway.

Weight on take-off	47,172 pounds.
Allowable limits	48,000 pounds.
Excess	172 pounds.

There is a parenthetical expression there saying "At least"; apparently there was some question of the precise weight.

Mr. HINSHAW. Let us get down to that case. You had five-thousand-some-odd feet of altitude at that point?

Mr. CHAMBERLAIN. That is correct.

Mr. HINSHAW. How do you figure 48,000 pounds allowable take-off weight, when that is the maximum?

Mr. CHAMBERLAIN. This apparently is a cargo flight, and the requirements do not prescribe a corresponding reduction in weight with an increase in elevation of take-off area for cargo-type operation.

I mentioned yesterday, I believe, that the transport category requirements, which apply to passenger operation, do prescribe such a reduction. It was not applicable in this case, however.

Mr. HINSHAW. Go ahead.

Mr. CHAMBERLAIN (reading):

Runway length	6,980 feet.
Published elevation	5,325 ASL.
Density altitude	6,500 feet.

Information contained in the CAA-approved flight manual for this model aircraft shows that, under the weight conditions, noted above and at the density altitude of 6,500 feet which existed at time of take-off, the aircraft should have attained an altitude of 50 feet and an air speed of 123½ miles per hour after traversing a distance of approximately 5,850 feet from the start of its take-off run. The runway (No. 17) at this airport (Stapleton) has a slight uphill gradient, the south end being 40 feet higher than the north end. This gradient would normally lengthen the take-off run by 320 feet, assuming that the aircraft became airborne at 95 miles per hour and the gradient was uniform. However, since the aircraft accelerated to an air speed of only 90 to 100 miles per hour and was pulled off the ground just before it reached the end of the 6,980 feet runway, it is apparent on the basis of these figures that the take-off was subnormal due to an increase over the normal drag in the take-off configuration, or to a loss of thrust horsepower, or to a combination of the two. The pilot of this plane stated that it was consistently slower in accelerating and taking off than any other aircraft of the same type that he had flown.

Investigation disclosed, among other things, no evidence to indicate any loss of thrust horsepower due either to the propellers not being in low-pitch position or to the malfunction of the power plants. An examination of the engines and propeller disclosed no defects which could have resulted in any substantial loss of power and the crew members stated that the engines operated normally at 2,700 r. p. m. and 45 inches of manifold pressure at take-off.

The probable cause of this accident was the subnormal take-off performance of the aircraft, the reason for which cannot be determined.

ACCIDENT NO. 8

This accident occurred at Chicago, Ill., on January 4, 1951, and involved the Monarch Air Service, an irregular air carrier. The aircraft crashed and burned following an attempted take-off from Midway Airport. All of the 45 passengers and crew of 3 escaped, with only minor injuries to 5 of them.

The record indicates the following: Take-off was started on runway 31 (4,730 feet long). It was stated by the copilot that he observed a very light coating of ice on the wings prior to taxying, but that it was his opinion that it was of insufficient magnitude to have an adverse effect on the flight characteristics of the aircraft. Aircraft became airborne approximately halfway down the runway. At the time the copilot retracted the landing gear he noticed that the aircraft, now airborne, was turning slightly to the left and the air-speed indicator read approximately 85 miles per hour. With left wing down and with but a few feet of altitude, the copilot, realizing an emergency existed, immediately applied emergency take-off power—55 inches manifold pressure. However, the C–46, still turning, struck several small aircraft parked on the west side of the airport, and continued beyond the airport boundary, striking a fence and railroad embankment. The maximum indicated air speed attained in flight, approximately 100 miles per hour, was noticed by the captain shortly after the landing gear was retracted, and the maximum altitude attained was estimated at 25 feet.

As stated above, the aircraft was concluded to have become airborne at a speed of 85 miles per hour, or less. The recommended break-ground speed for this type aircraft is 105 miles per hour, and the power-on stalling speed is 92 miles per hour, when the aircraft is loaded to its maximum authorized weight. The recommended take-off power setting is 52 inches manifold pressure prior to becoming airborne. On take-off, evidence indicates that the pilot advanced the throttles to approximately 45 inches manifold pressure and 2,700 r. p. m., and the copilot then continued to advance the throttles to a manifold pressure of 47 inches.

Weight on take-off	[1] pounds	26,100
Certificated limits	do	45,000
Excess	do	1,100
Runway length	feet	5,730

[1] Approximately.

The Board has not yet issued any formal report on this accident.

ACCIDENT NO. 9

This accident occurred on December 10, 1947, at Chicago, Ill. (slick). On take-off, plane became airborne for about 2,100 feet and gained 15–100 feet when it stalled back to the ground.

Weight on take-off	pounds	45,000
Allowable limits	do	45,000

With approximately 3 inches of light snow on the ground, the aircraft was taxied to runway (22L) for engine run-up. Take-off was made on a straight course for a distance of some 2,200 feet. Both wheels left ground simultaneously and the aircraft was airborne for approximately 2,100 feet attaining an altitude variously reported as 15 to 100 feet. Then it settled back to the ground to the left of the runway on its belly into some parked planes. The probable cause was given as inadvertent stall immediately after take-off—pilot error.

Mr. HINSHAW. Mr. Chairman, I recall Mr. Chamberlain informed us yesterday that the single-engine performance of this airplane at sea level under its conditions of retraction or just before the retraction of landing gear and so forth indicated that the airplane could take something like 36,000 pounds, and perhaps slightly over that, and become airborne; is that correct? If I have not stated it correctly, will you please state it correctly?

Mr. CHAMBERLAIN. Yes, sir; I will. It can become airborne and have a positive rate of climb at a higher rate than that. It can comply with the transport category requirements only at approximately 36,000 pounds, which require for this particular airplane a positive rate of climb in the configuration you stated of approximately 270 feet per minute.

Mr. HINSHAW. What rate of climb can it achieve with the weight you were speaking of? You spoke of some higher rates at which it could still climb.

Mr. CHAMBERLAIN. If I recall the figures correctly, it has a zero rate of climb at somewhere in the neighborhood of 43,500 to 44,000 pounds.

Mr. HINSHAW. That is zero?

Mr. CHAMBERLAIN. That is zero rate of climb. It has a negative rate of climb at 48,000 pounds with the landing gear retracted and the propeller windmilling. That negative rate of climb reduces to zero in the vicinity of 44,000 pounds and becomes positive to the extent of about 270 feet a minute, which would be required by the transport category requirements, down to 36,000 pounds.

Mr. HINSHAW. Do you have the history of the certification of this aircraft so that you can describe it to the committee, as to how it became certificated for 45,000 pounds for passengers and 48,000 pounds for cargo?

Mr. CHAMBERLAIN. I have a general knowledge of that, sir, and some data on it. However, since the actual certification process is one which is handled by the CAA, and since appropriate people from that agency are here, it might be more timesaving to the committee to hear from them directly on that, if you wish.

Mr. HINSHAW. If that is agreeable, Mr. Chairman, I think it would be well to have that in the record.

Mr. BECKWORTH. At this point?

Mr. HINSHAW. Yes. I believe Mr. Hensley is here from the CAA.

Mr. O'HARA. I would like to ask a couple of questions before Mr. Chamberlain leaves.

Mr. HINSHAW. He is not going to leave.

Mr. HENSLEY. Mr. Chairman, I believe Mr. Meyersberg is better prepared for that answer, if it is all right.

Mr. BECKWORTH. All right.

Mr. CHAMBERLAIN. Mr. Chairman, while Mr. Meyersberg is coming up, may I offer certain other statistical documents which the committee asked for yesterday, and of which the report I read is a part?

Mr. BECKWORTH. The committee will receive them, to be filed for the committee.

(The documents were filed for the information of the committee.)

Mr. BECKWORTH. Will you state your full name, please, and your official capacity.

STATEMENT OF ROBERT B. MEYERSBURG, CHIEF OF THE FLIGHT TEST SECTION, CIVIL AERONAUTICS ADMINISTRATION

Mr. MEYERSBURG. Yes. My name is Robert Meyersburg; Chief of the Flight Test Section of the CAA.

Mr. HINSHAW. Mr. Meyersburg, will you give us the history of the certification of this aircraft for use, I assume, in the Irregular Car-

rier Division at 45,000 pounds carrying capacity and 48,000 pounds for cargo?

Mr. MEYERSBURG. Yes, sir. Very briefly, the airplane was initially presented to the CAA for certification in 1945, to be certificated under the part 3 requirement, under the normal category of CAR–3. The initial certification was at that time conducted at 45,000 pounds. The type certificate that was issued became the property of the applicant, and in cases where other individuals wished to operate the airplane and were unable to get the original type certificate they in turn requested certification under exactly the same terms as the initial applicant did, merely duplicating the process, so to speak, in order that they could have their own type certificates. So the airplane, to the best of my memory, was subjected to about five separate examinations under CAR–3, all but one at the weight of 45,000 pounds.

One particular one, as I recall it, was at the weight of 44,000 pounds, because of an experimental propeller installation placed on it by the Curtis Corp., but I do not believe any more than one airplane of that nature was ever certificated.

Then in 1949 Pan American World Airways——

Mr. HINSHAW. Let us come back to the original certification, now. What tests were made? Were single-engine tests made? Engine-out tests? Stall-speed tests? All the rest of those things? What tests were made?

Mr. MEYERSBURG. Yes, sir. The actual flight test requirements under CAR–3 only involve the conduct of an en route climb test; not take-off.

Mr. HINSHAW. What test?

Mr. MEYERSBURG. En route climb.

Mr. HINSHAW. En route climb?

Mr. MEYERSBURG. En route climb with one engine feathered at 5,000 feet. No take-off tests of any kind were required so none were made.

The en route climb of CAR–3 actually limits the weight of the airplane.

Then in 1949 Pan American World Airways——

Mr. HINSHAW. Let us get at this. You said a 5,000 foot altitude, en route climb, with one engine out.

Mr. MEYERSBURG. Yes, sir.

Mr. HINSHAW. How much climb and for how long?

Mr. MEYERSBURG. It is a rate of climb per minute that is required. I believe roughly 130 feet per minute climb would be required, based on the stall speed of the airplane, and the weight, and power available.

Mr. HINSHAW. To what altitude does it have to be able to climb at that rate of climb?

Mr. MEYERSBURG. It would have to demonstrate this rate of climb at an altitude of 5,000 feet.

Mr. HINSHAW. Only momentarily?

Mr. MEYERSBURG. Continuously through that altitude. Of course, as it would climb higher the rate of climb would drop off, because the power would be reduced due to the lower density of the altitude.

Mr. HINSHAW. What would its ceiling be under an estimated weight of 45,000 pounds?

Mr. MEYERSBURG. I would estimate the absolute ceiling would be somewhere around 9,500 feet.

Mr. HINSHAW. The rate would be slowed prior to that?

Mr. MEYERSBURG. It would gradually reduce, until it got to the point of no climb.

Mr. HINSHAW. Were those single-engine tests made at the weight of 48,000 pounds?

Mr. MEYERSBURG. Yes, sir. The single-engine tests were made at the weight of 48,000 pounds with one exception, and that is that 100 more horsepower was drawn from the operating engine.

Mr. HINSHAW. What did that result in?

Mr. MEYERSBURG. That resulted in a certification of the F model airplane at 48,000 pounds rather than 45,000 pounds.

Mr. HINSHAW. You say the F model. I assume there must have been A, B, C, and D models.

Mr. MEYERSBURG. There was an A, D, E, and F. The A and D are essentially the same, and the E and F are essentially the same.

Mr. HINSHAW. The difference being what?

Mr. MEYERSBURG. The primary difference being the power.

Mr. HINSHAW. You mean the actual horsepower rating of the engine?

Mr. MEYERSBURG. That is correct; although it is exactly the same engine.

Mr. HINSHAW. What would account for that difference in rating?

Mr. MEYERSBURG. The applicant for the 48,000-pound certificate arranged to have the engine rerated at 1,700 horsepower for continuous operation as against 1,600 horsepower.

Mr. HINSHAW. You say he arranged it. With whom did he arrange that?

Mr. MEYERSBURG. The engine was actually type certificated. The original type certificate for the engine was modified to permit drawing the extra power out of it by merely increasing the RPM and manifold pressure. That was done by the CAA.

Mr. HINSHAW. That is slightly inexplicable to me, Mr. Chairman, when there is a rate for the same engine of 1 horsepower for one operation and another horsepower for another. I do not quite understand it.

Mr. MEYERSBURG. Actually it involves slightly more than rating a different horsepower for different operators. Different power settings are approved on the engine. It would be possible, I believe, for any C–46 operator, by substantiating the engine installation and adding power, to demonstrate his airplane at the higher power. It would be neecssary for him to demonstrate that the airplane could adequately meeting the cooling requirements.

Mr. HINSHAW. All right. Let us go ahead with the 1949 tests.

Mr. MEYERSBURG. The 1949 tests, as I have described, raised the weight to 48,00 pounds. That is the highest certification that has been granted so far.

Mr. HINSHAW. And that 48,000 pounds is for cargo only, or for cargo and passengers?

Mr. MEYERSBURG. The basic requirement does not limit it to cargo only or passengers only; it is for both.

Mr. HINSHAW. For both. Mr. Chamberlain mentioned a moment ago that the gross load limit in certain cases was 45,000 pounds for passengers and that the limit for cargo was 48,000. Where does the difference come in between the two statements?

Mr. MEYERSBURG. Well, prior to 1949 when the highest certificated weight was only 45,000 pounds, both cargo and passenger accidents described at that time would be at weights of 45,000 pounds or below; that is, certificated weights. After 1949 any airplane type certificated for 48,000 pounds involved in an accident would appear as a 48,000-pound airplane.

Mr. HINSHAW. Obviously CAR–3, part 3 of the Civil Air Regulations, does not require these other tests which are required in the transport category.

Mr. MEYERSBURG. No, sir. It actually requires only the one test to limit the weight, the en route climb. It takes no account whatsoever of the take-off performance of the airplane.

Mr. HINSHAW. How long ago, Mr. Chamberlain, was consideration first given by the Civil Aeronuatics Board to require that all aircraft used in civil air transportation should meet the transport category requirements? Perhaps I should not ask you this question, because you are not a member of the Board.

STATEMENT OF JOHN M. CHAMBERLAIN, EMORY T. NUNNELEY, AND E. S. HENSLEY—Resumed

Mr. CHAMBERLAIN. Well, to my knowledge, sir, I think the Board has given consideration to that problem in connection with the C–46 in particular for some time. It has been for the matter of 2 years or so, I would say. I cannot pin it down particularly.

Mr. HINSHAW. Do you know whether or not it was considered in 1945, when this aircraft was first offered for certification?

Mr. CHAMBERLAIN. I doubt if it was considered in 1945. I cannot say authoritatively, but I have no recollection of it having been considered at that time. However, soon after that, when the separate set of requirements for irregular air carrier operation, known as part 42, were developed, consideration was given to that fact, I think. However, it was not considered necessary to apply these regulations retroactively to this airplane, which was already in operation then.

Mr. HINSHAW. My reason for making that inquiry is that it just seems to me personally, as one member of this committee, that consideration might very well have been given not only to the question of how much the aircraft would carry under normal operating conditions, but what its performance would be in landing or taking off from airports, particularly those in densely populated areas or at altitudes and under conditions which are known to arise from time to time and which your reports indicate had arisen five times prior to last October; namely, in the single-engine operation.

Perhaps one might inquire as to whether the sole consideration is that of the passengers and the crew, or whether consideration might likewise be given to those who live in densely populated areas, under the same single-engine operation conditions? Obviously if the airplane cannot carry anything at sea level under single-engine operation in its critical stage then anybody living in the vicinity of such an airport is under a hazard, is he not?

Mr. CHAMBERLAIN. That would be true; yes, sir.

Mr. HINSHAW. Where that airplane landed and took off.

Mr. CHAMBERLAIN. That is correct.

I think I mentioned yesterday in response to a question that the Board certainly has been cognizant of the problem with respect to persons on the ground. However, I think of first importance is always the problem of the people in the air. You always have people in the airplanes, and those people are always considered. You may or may not have people on the ground. I think you can consider the thing initially on the basis of the people who are going to be in the airplane, in any case.

Mr. HINSHAW. Well, that is quite true, but the principal termini of air carriers of all kinds and descriptions seem to be in densely populated areas. That is where they land and take off from, principally.

Mr. CHAMBERLAIN. That is correct.

Mr. HINSHAW. The en route places are not so important from that standpoint, of course.

Mr. CHAMBERLAIN. Yes.

Mr. HINSHAW. Because frequently the airports are in wide-open country.

Mr. CHAMBERLAIN. Yes, sir.

Mr. HINSHAW. But that is not true in the terminal areas.

Mr. Chairman, for the record, I wish that the Civil Aeronautics Board and the Civil Aeronautics Administration, either jointly or severally, would place in the record the deficiencies in characteristics which this airplane has in respect to the transport category requirements, so that we may know just where those deficiencies are.

Also, we would like to know where its superior aspects may be. You mentioned yesterday, Mr. Chamberlain, that it had certain compensating factors which should be taken into consideration. I think the committee would very much like to know what those compensating factors are, likewise.

We are not condemning the ariplane as such until we see it all added up together. Obviously if it performs badly with a low or relatively low quality of gasoline on take-offs, if it performs badly under single-engine operation at its critical stage of take-off, and so forth, we ought to know those things; because those are matters of vital importance with respect to safety not only of passengers but of persons on the ground. If that can be put together—unless you have some statistics now that you want to offer—and be put in the record, all well and good.

Mr. CHAMBERLAIN. I think it would be perhaps better to put it together and offer it for the record.

(The information is as follows:)

A GENERAL SURVEY OF THE DEFICIENCIES AND ADVANTAGES OF THE C–46 AIRPLANE IN THE TRANSPORT CATEGORY

The following data are extracted from the CAA engineering flight test report on C–46F transport category performance dated March 7, 1951.

In preface, it should be understood that the transport category requirements of CAR 4b are an instrument for defining a minimum level of safety. This level of safety is expressed in various ways relative to the airplane (viz maximum weights for take-off and landing, minimum runway lengths for take-off and landing, operating speeds and engine condition which it has been demonstrated may be safely used, etc.).

The transport category requirements limiting the take-off weight function by requiring a specific positive rate of climb following the sudden and complete loss of power of one engine at the most critical point of take-off (i. e., that point at which the airplane can either be brought to a safe stop within the length of

runway available ahead of the airplane, or alternatively flown safely off the runway, with a net height of 50 feet attained by the time the airplane passes over the runway end).

Two "segments" of the take-off flight path define the operating level of safety of take-off performance:

First segment climb, which requires a net rate-of-climb of 50 feet per minute following complete engine failure at the critical engine failure speed described above, with the landing gear extended, wing flaps in the take-off position, and the propeller of the failed engine windmilling in take-off pitch.

At sea level, in conditions of standard temperature and humidity, the C–46F is limited in this segment to a take-off weight of 38,050 pounds. At a field altitude of 5,000 feet (Denver, for example) the take-off weight would have to be reduced to 31,900 pounds. If the C–46F were to demonstrate its performance in this configuration at its present operating weight of 48,000 pounds, it would have, instead of a 50-foot-per-minute rate of climb at sea level, a rate of sink of some 197 feet per minute. As a matter of fact, in order to have no rate of sink, but merely a zero rate of climb, the weight would have to be reduced to 39,850 pounds.

Second segment climb, which requires a net rate of climb equal, in feet per minute, to the arithmetic product of the square of the stalling speed (expressed in miles per hour) multiplied by the factor 0.035, demonstrated at the minimum safe take-off speed with the landing gear retracted, but all other airplane devices in the same position as in the first segment climb just described.

At sea level the C–46F is limited in this segment to a take-off gross weight of 36,200 pounds; and at a field altitude of 5,000 feet this weight would be reduced to 31,650 pounds. If examination of the C–46F at its present certificated weight were made to the second segment climb requirements of the transport category, instead of demonstrating the required climb of 304 feet per minute, the airplane would sink at the rate of 105 feet per minute. The weight at which a zero rate of climb could be met would be in the order of 43,900 pounds.

As can be seen, the second segment climb requirement is the more critical of the two and limits the certificable weight of the C–46F to 36,200 pounds. The empty weight of the airplane equipped for passenger operation is somewhere in the neighborhood of 31,000 pounds.

The landing climb requirement of the transport category allows the C–46F a maximum landing weight of 46,500 pounds. However, this requirement is overridden both by the approach climb requirement (which fixes the landing weight) and the take-off climb requirements, which render any landing weight in excess of the take-off weight unusable in any case.

The approach climb requirement, which conceives a missed approach with an engine already inoperative and its propeller feathered, permits a maximum landing weight at sea level of 44,325 pounds. However, since the take-off weight could not exceed 36,200 pounds, this landing weight is without practical significance.

The primary reason that the weight of the C–46F is some 25 percent lower in the transport category than in its presently certificated normal category of CAR 3 is that no take-off ability following engine failure is contemplated in the normal category. The ability to remain aloft with one engine inoperative and in the most advantageous airplane configuration (landing gear and flaps retracted, inoperative propeller feathered, and continuous rather than take-off power on the remaining engine) is the limiting criterion of CAR 3, and this is insured by requiring a rate of climb in this configuration of 142 feet per minute for the 48,000-pound airplane.

Mr. CHAMBERLAIN. I might add one more word of explanation there. The Board's rule-making processes which I have referred to yesterday, which started in the summer of last year and are still in process, as a result of the public hearing that was held here last October, are not quite terminated yet. It is a matter of days or a very few weeks away. Some of the evidence that has been offered in the past, I believe, is controverted to some extent.

There may be some specific questions that will be difficult to answer with the positiveness that the Board would like, and with which they will be able to in a matter of days, when this other proceeding is con-

cluded. There are certain things which can be stated now, I think, and without difficulty.

Mr. HINSHAW. I read some place a little while back that the CAA, I believe it was, took the C–46's to some place in Florida to put them through their paces. I assume that the record of those experiments or tests or whatever they may have been are available.

Mr. CHAMBERLAIN. Yes, sir.

Mr. HINSHAW. And that certain conclusions may have been drawn therefrom.

Mr. CHAMBERLAIN. That is correct.

Mr. HINSHAW. Mr. Meyersburg, were you in charge of those tests?

Mr. MEYERSBURG. Yes, sir; I was.

Mr. HINSHAW. Did those tests include simulated or actual single-engine take-off?

Mr. MEYERSBURG. Yes, they did, sir.

Mr. HINSHAW. And you have the record as to the ability of the aircraft?

Mr. MEYERSBURG. Yes, sir. Those records exist.

Mr. HINSHAW. The particular example of that airplane, or examples, which you tested?

Mr. MEYERSBURG. Yes. sir.

Mr. HINSHAW. Was a critical point found to exist with respect to weight; and, if so, what was it?

Mr. MEYERSBURG. 36,200 pounds, sir, in respect to the transport category requirements.

Mr. HINSHAW. 36,200 pounds?

Mr. MEYERSBURG. Yes, sir.

Mr. HINSHAW. Take-off?

Mr. MEYERSBURG. Take-off at sea level.

Mr. HINSHAW. In the critical stage?

Mr. MEYERSBURG. Yes, sir.

Mr. HINSHAW. I understand that the Board issued a proposed ruling recently reducing those gross weight limits from 48,000 to 45,000; is that correct?

Mr. CHAMBERLAIN. That is correct, sir.

Mr. HINSHAW. Perhaps Mr. Nunneley should answer this question: What has ensued since the order was issued?

Mr. NUNNELEY. Subsequent to the issuance of that order two plaintiffs, Air Transport Associates, one of the irregular carriers, and the Council for C–46 Engineering, which is a group of carriers using C–46 aircraft, went to the district court and sought an injunction to prevent that regulation from taking effect. The regulation was issued on an emergency basis to become immediately effective. After a hearing the court denied the motion for a preliminary injunction and the regulation is in full force and effect.

We are advised that the Council for C–46 Engineering plans to take an appeal from that decision of the district court. Of course, if it does we will meet that when it occurs.

Mr. HINSHAW. In other words, your emergency procedure reducing gross weight from 48,000 to 45,000 pounds is in effect?

Mr. NUNNELEY. That is correct. That ruling is in effect and will remain so unless the court directs otherwise or until the Board completes the proceedings for permanent action. Incidentally, it should

be made clear that the emergency regulation was directed to the use in passenger service, not cargo service.

Mr. HINSHAW. The 48,000 limit still operates in cargo service?

Mr. NUNNELEY. That is correct.

Mr. HINSHAW. Where only the crew is at stake, so far as their lives are concerned, and the lives of those who may be in the path of the airplane which requires single-engine performance?

Mr. NUNNELEY. That is correct, sir. The weight is still applicable to the cargo operations, which may continue at that weight.

Mr. HINSHAW. I yield the floor, Mr. Chairman.

Mr. BECKWORTH. Do you have any questions, Mr. Wolverton?

Mr. WOLVERTON. In noting the causes which were alleged as the reasons for the accidents in the nine cases which you read to us, it seemed to me as a layman that if there had been proper inspection those occurrences would not have happened. Is it your opinion that the inspection which is required before planes are permitted to take off would have revealed those deficiencies which afterwards developed into accidents?

Mr. CHAMBERLAIN. I think there is no question, sir, but that in many of the cases that I referred to there was an inadequate inspection. However, the immediate inspection of a particular airplane before a particular flight has been and of necessity must be the responsibility of the particular operator, and cannot be done in individual cases by any Government agency such as the CAA, for example.

Mr. WOLVERTON. Let me understand the procedure. There is an advertised flight from Newark Airport to Miami, such as was the case in this last accident. Before that plane takes off, is it the duty of any Government official to examine the engine or any of the other important parts of the aircraft from the standpoint of assuring safety to the passengers who are on that plane?

Mr. CHAMBERLAIN. No, sir; it is neither the duty nor a physical possibility, in view of the number of Government people there are available for such service, and in view of the number of take-offs there are every few minutes during the day.

Mr. WOLVERTON. What assurance does a passenger have who intends to make a flight of that character that the plane is in a safe operating condition?

Mr. CHAMBERLAIN. I think he has the assurance of a body of Government regulations which are established by the Board and supplemented in some cases by the CAA, and implemented and enforced by the CAA in connection with the particular operator. Furthermore, CAA checks, periodically, particularly with respect to the systems for inspection and maintenance that the particular operator has established for assuring the safety of each particular flight.

I think perhaps Mr. Meyersburg or Mr. Hensley would prefer to answer that particular question in more detail.

Mr. WOLVERTON. Am I to infer from the answer you have given that after the fixing of the specifications preliminary to certification and the regulations that are adopted to provide safety of travel, that from that point on the Department washes its hands of any effort to ascertain whether those important features are being complied with?

Mr. CHAMBERLAIN. No, sir.

Mr. WOLVERTON. If they do not wash their hands of it, who takes over at the airport on behalf of Government agencies before that plane takes off, so that I, as a passenger sitting in that plane, may know that it does meet the specifications and is in every sense airworthy to insure a safe passage to me? Whose responsibility is that?

Mr. CHAMBERLAIN. In the specific instance——

Mr. WOLVERTON. I am taking a specific instance. I am taking the flight that I made the other day from Washington Airport to La-Guardia. Or I will take the possible one which originated in this accident, a trip from Newark to Miami. Did anybody examine the plane I traveled on to New York before it took off from the National Airport, to give me assurance that it was airworthy in every respect?

Mr. CHAMBERLAIN. I would presume, sir, that no Government representative or Government employee did so. He might have as a spot-checking proposition. However, I think it would be more appropriate for Mr. Hensley, who has direct cognizance over that type of activity, to answer your question more fully.

Mr. WOLVERTON. Very well. Mr. Hensley, will you answer the thought that I have expressed in my question?

Mr. HENSLEY. Mr. Congressman, if I may try to simplify this thing a little bit, I don't believe it is quite as complicated as that.

Mr. WOLVERTON. I do not know that my question was complicated. I was merely asking whether any Government official makes any inspection of a plane before it takes off for a given flight.

Mr. HENSLEY. Yes, sir. It is quite often done on individual aircraft by our own agents, but not on every one.

Mr. WOLVERTON. Now, just a moment. You say it is quite often done.

Mr. HENSLEY. Yes, sir.

Mr. WOLVERTON. That answer would indicate that it is not always done; is that right?

Mr. HENSLEY. That is correct, sir.

Mr. WOLVERTON. Now, in what percentage of cases is it done, and in what percentage is it not done?

Mr. HENSLEY. I can't give it to you in an expression of percentages, and if I may, I would like to explain the system used.

Mr. WOLVERTON. Then what rules or regulations or procedures do you have that result in its being done sometimes and not other times? Why is it done sometimes and not in all?

Mr. HENSLEY. The reason it is not done in all instances is because we do not have the number of coverages or number of Government people to make physical inspections in all cases, and in lieu of that, our inspection, the Government agent's inspection is made up of the procedures and the inspection systems of the carrier, who shares and assumes the responsibility for seeing to it that the prescribed inspections of the aircraft structure, of the equipment, and even of the procedures and facilities used in the operation of that aircraft have been checked and found satisfactory; my point being that the CAA agent's responsibility in checking is that of supervising or checking the system that is used by the carrier to insure that the equipment is checked at the prescribed intervals.

Mr. WOLVERTON. In other words, you divert what would seem to me to be your responsibility to the company itself.

Mr. HENSLEY. It could be said that way. I would prefer to say that we share the responsibility. We do not walk away from the responsibility. It is a joint one, in which we share.

Mr. WOLVERTON. Your answer would indicate to me that the sharing process results in permitting the company itself to pass upon the question?

Mr. HENSLEY. It does; yes, sir.

Mr. WOLVERTON. Am I to take from that that the reason you leave it to the company itself is because you do not have sufficient personnel to do it yourselves?

Mr. HENSLEY. No, sir; that is not the reason. I think it is quite proper to share and place primary responsibility, if you like, for the detailed inspection of the aircraft and its equipment with the company.

Mr. WOLVERTON. Well, the company, I take it, is an interested party, and, as records show after crashes have taken place, in many cases—too many, in my opinion—the company is inclined to neglect its duty as fixed by your regulations.

In one or more of these cases that were read to us, I mention just by way of illustration, they were overloaded. Who determines the load that goes out, and how is it determined what the load is that that particular plane has at the time it takes off? Do you leave that to the company without any inspection whatsoever by a Government official?

Mr. HENSLEY. As a rule, that is left to the company, but not without Government supervision. It is the primary responsibility of the operator to load the aircraft in accordance with a loading schedule that is already approved by the CAA. It is his responsibility to assure that the loading of that aircraft is in accordance with the approved schedule.

Now, our agents do spot check—"spot check" is the best term I can use for it—the operations of the company to insure that it does comply. And I will have to say that in quite a few instances we do find violations of the loading schedule.

Our method of checking that is to start with the company in the process of loading the aircraft and check right through the procedure with them. to insure that it is followed.

Mr. WOLVERTON. Well, when you say that you spot check, that indicates to me that you realize that there is a necessity for a check to be made and that it is proper that one should be made.

Now, if that is the case, then how do you explain that you only do it in spot cases? When an accident happened and it is found that it is overloaded, we have knowledge of it. If a plane happens to be fortunate and gets through, even though it had been overloaded, we do not. Therefore, there may be many, many instances, which I have no doubt has been the case, where planes have gone through overloaded, and where evidently you did not know anything about it whatsoever, and if an accident happened and was due to that, it would have been a matter that could have been prevented if there could have been a proper inspection made.

Now, how do you justify spot checks, and how often are spot checks made? That is a very indefinite term.

Mr. HENSLEY. Well, I can read from our instructions much more specifically, and cite the frequency with which we spot check the various phases of the operation of the carriers that we are talking about.

Mr. WOLVERTON. How do you determine the weight? I do not mean all the detail of it, but when you speak of overloaded 3,000 or 2,790 pounds, how have you determined that? By the manifests?

Mr. HENSLEY. Yes, sir; jointly with the loading schedule of the aircraft.

Mr. WOLVERTON. You take the manifest, and that indicates the weight to you? Is that right?

Mr. HENSLEY. May we start with what we call a loading schedule, which carries the empty weight of the aircraft to begin with; that is, the bare weight of the aircraft plus the equipment, which has been established by actual weighing. Now, with that is a loading schedule which is a part of the aircraft specifications, and shows where certain loads shall be placed in the aircraft, including gasoline, crew, passengers, cargo, and so forth.

Now, that is the procedure for loading the aircraft to achieve both the proper weight and the balance with that weight.

Then the manifest is made up to reflect what will be placed in the aircraft for this particular operation. So the two working together, the loading schedule with the manifest, reflect the maximum weight of the aircraft under that particular condition for that particular trip.

Mr. WOLVERTON. Then how do you explain, in these instances where a plane has taken off with overweight and there has been a crash, or how do you justify, not having known that before the plane took off?

Mr. HENSLEY. I don't attempt to justify it, except to explain that either the carrier did not discharge his responsibility or I did not completely discharge mine by getting there and learning of the overload, because of, I will just have to say, an obvious lack of sufficient personnel to be stationed at every airport where these operators wish to operate.

Mr. WOLVERTON. Now, it would seem to me that, with the frequency with which it is known that planes do take off overloaded, there is no justification whatsoever for permitting a practice of that kind to continue. I hesitate to express a remedy, as I have already stated on several occasions. I am only a layman, and this seems so simple to me, as to ascertaining the weight—that is, this suggestion I am about to make—that I hesitate to make it.

Would it be possible to have a weighmaster that, as the plane was about to take off, would mean that it would go on a scale for the weight to be taken?

Mr. HENSLEY. Yes, sir; it would be possible.

Mr. WOLVERTON. Then, if that is possible, the same as purchasers of coal are frequently taken care of by having the weighmaster give the weight of the coal they are purchasing, if that plane would just drive out to the weighmaster to have the weight taken, would that not answer the question very simply? Would it or would it not?

Mr. HENSLEY. No, sir; I am sorry to say it is not quite that simple.

Mr. WOLVERTON. Maybe that is the reason it has not been done, then. It is just simple.

Mr. HENSLEY. Well, may I say very briefly that the effect of the wind, even a very light wind, on an airplane's airfoil, has a tremendous effect on the actual weight of the aircraft. So to follow through on your idea, in my opinion, would require a sizable hangar that could

accommodate easily the aircraft being rolled in, the door closed, the placing of it on the scale, the weight determination, and then a rolling out on the other side. I visualized that when you mentioned the weighing process.

Mr. WOLVERTON. I did not necessarily include a hangar in my thoughts. I only went to the point of having a scale. It rolls on the scale, and it is weighed. And it is 48,000 instead of 45,000. There is your knowledge immediately; is it not?

Mr. HENSLEY. That is true, and it is quite accurate, and we do have such scales available. We do make very frequent use of them for establishing the empty weight of an aircraft, when it may have grown suspicious, or records have been lost as to the actual equipment that had been added or removed from the aircraft. But it is a rather tedious operation to get it away from the wind effect so that this accurate weight we are talking about can be established.

Mr. WOLVERTON. The question of tediousness does not appeal to me very strongly. I am thinking more from the standpoint of safety, which we are investigating. And the mere fact that it is a bit tedious does not appeal to me so strongly as to justify the doing away with the practice.

Now, you say you do make a spot check. What do you do when you make a spot check? Is the plane actually weighed, or do you do it by the formula or procedure that you suggested earlier in your testimony?

Mr. HENSLEY. No, sir. The spot check is a complete review of that phase of the operation, and I did not include weighing of the aircraft as a spot check. That would normally be a part of a certification procedure of the aircraft airworthiness. It would normally be done at a time when the aircraft was being overhauled or repaired for some reason.

Mr. WOLVERTON. Now, what procedure would you have had at the Newark airport to determine whether that plane that took off and crashed was overloaded or not? How would you determine its weight?

Mr. HENSLEY. Well, the first step would be reference to the loading schedule of the aircraft, where the basic weights are known by previous actual weighings with the equipment involved. Then the number of passengers, the cargo, the amount of fuel required for the journey were all known beforehand and calculated on the manifest; and it was one of calculation, not of actual weighing.

Mr. WOLVERTON. Now, how do you calculate the weight of passengers? When I went on a plane they used to weigh me to see what the weight was; that is, in earlier days.

Mr. HENSLEY. That was the practice, sir, for a number of years. However, the average weight of the passengers over a period of years fluctuated so little in a load of passengers, that it was found that we could accept a basic weight of passengers and baggage for a winter and a summer operation. It is taken at a figure known to be a good, sound average figure per passenger without the necessity of weighing each individual.

Mr. WOLVERTON. You still do weigh and require to be weighed the baggage that the passenger takes?

Mr. HENSLEY. Yes, sir; that is correct.

Mr. WOLVERTON. You have never gotten to the point where you could estimate an average weight on baggage, then?

Mr. HENSLEY. Yes, sir. I might say some operators have asked us to consider that, and we have. However, as you say, baggage we find does fluctuate more widely than people, on an average load, and we have not yet seen fit to go to an average baggage weight per passenger.

Mr. WOLVERTON. Now, coming down to other matters of examination, with respect to the controls, proper operation, cylinders of the engine, which in some of those instances were spoken of as being corroded, or the spark plugs were, and so forth: Is there any way that that could be examined before the plane took off, by inspection?

Mr. HENSLEY. Yes. sir; there is a way.

Mr. WOLVERTON. What is the way that you are now utilizing in doing that?

Mr. HENSLEY. In the certification of an air carrier in the initial process, there is a requirement by regulation for a manual of operations, which sets forth the manner the carrier proposes to conduct his operation. Also all of his employees are required to be familiar with the procedures established for the inspection of any particular item and for the other features of his operation. In this manual there is an approved inspection procedure or a method of insuring that a responsible person inspects, in the nature of a preflight inspection; that is, this initial inspection prior to the flight. Also at certain periodic intervals various components or equipment or parts of the aircraft are required to be inspected by a competent person to insure that they are in satisfactory condition.

Mr. WOLVERTON. Now, is that a Government official or a company official, that competent individual?

Mr. HENSLEY. It is a company official certificated by the Government, the CAA, in that particular specialty or activity.

Mr. WOLVERTON. Before there is a flight, is there any Government official who must have presented to him that report of the official of the company, that the plane is airworthy and the engines are operating in an efficient manner?

Mr. HENSLEY. Not immediately prior to each flight; no, sir. However, the records of those inspections are required to be maintained by the company, and they are at periodic intervals inspected by the Government agent.

Mr. WOLVERTON. Then we are at a point where there is a flight about to take place from the Newark Airport to Miami, in which there may or my not have been any examination either by a company official or by a Government official to ascertain whether it is in good condition.

Mr. HENSLEY. No, sir; I won't quite agree with that. There may not have been any inspection by a Government official; yes. But to say that there was no inspection by a company employee responsible for those inspections—no, sir.

Mr. WOLVERTON. I do not want to misunderstand what you have said. I gathered that this inspection of the company was not necessarily preflight, that it might be at some particular period in the use of the airplane, and it might have been a month before, or some other time before, since the company official even examined the engine.

Now, what I am trying to arrive at is what inspection there is at the time that there is a flight taken off. I gather that there is none.

Mr. HENSLEY. Oh, yes; there is. There is a preflight inspection by the company; yes, sir.

Mr. WOLVERTON. Before it takes off?

Mr. HENSLEY. Yes, sir.

Mr. WOLVERTON. Who makes that inspection?

Mr. HENSLEY. An employee of the company.

Mr. WOLVERTON. Who, on the part of the Government, knows that he did so?

Mr. HENSLEY. At the particular time, no one knows first hand. There is a review of the records to make sure that the inspection was made. It is recorded by the company and later reviewed by our agent.

Mr. WOLVERTON. Take the cases that were mentioned here this afternoon, without going into the details of each one.

In some instances there is reference made to quite a number of spark plugs that were not in good shape. Now, why was that not detected either by the company or by somebody else before the plane took off, instead of finding it out afterward when an accident resulted?

Mr. HENSLEY. That should have been detected by the company.

Mr. WOLVERTON. All right. Was it a duty of some company representative before that plane took off to have examined those spark plugs?

Mr. HENSLEY. Yes.

Mr. WOLVERTON. Well, in that particular accident, was it done, or was it not done?

Mr. HENSLEY. I am not in position to say whether it was done in that specific instance, because the fault of the plugs seemed to have been the wrong type of plug, as I recall the instance you are referring to, rather than an inspection of the actual installation. It was just the wrong type of plug for that engine.

Mr. WOLVERTON. All right. That would have been very easily observable to anyone who had made an inspection, would it not?

Mr. HENSLEY. It could be just as well, shall I say, an honest mistake, in not knowing, or in selecting the wrong type of plug.

Mr. WOLVERTON. I would not take it that a person put a wrong plug in from criminal intent. But if your specifications or those of the manufacturer of the engine required a particular kind of a spark plug, and they put another one in different from that, it seems to me that that is a failure to comply with what a passenger would have a right to expect.

Mr. HENSLEY. I agree, sir.

Mr. WOLVERTON. Well, I will not pursue this any further, except: Have you ever found that your inspectors, or that company inspectors, for any reason—friendship, gratuities, favors, or otherwise—have been lax in this matter of inspection or certification of a flight or anything connected with it?

Mr. HENSLEY. I have not found any; no, sir. And I have investigated several complaints, shall I say, or accusations, of that sort of thing.

Mr. WOLVERTON. Well, without going into it at this time, I am inclined to think that maybe you will have your eyes opened.

Mr. BECKWORTH. Are you through, Mr. Wolverton?

Mr. WOLVERTON. I am through. I just would like to leave the thought that all of my questions have been based on the theory that

when a passenger takes passage in an airplane he should have the right to assume that that plane is airworthy and is in good condition.

Now, take this incident we have just had in Newark. People find fault with the Port Authority of New York. I do not take it from anything you have said or anybody else has said that that was an obligation of theirs, to see that airplanes taking off from the Newark Airport were in an airworthy condition. It was somebody else's duty. And that plane evidently was defective in some way. And I am not prejudging the case, for I do not know what the investigation will develop. But we certainly have found conditions that would indicate that the plane—not in this particular instance, for I am withholding judgment on that—but there have been cases where accidents have happened where, if the cause of the accident had been known before the plane took off, it would never have taken off. And I am speaking for a more thorough, a more complete, investigation of airplanes that hold themselves out for profit to take passengers on contemplated trips.

Mr. HENSLEY. Well, sir, I could certainly agree with you. And I am inclined to think that every reasonable inspection of this particular aircraft was made. I do not think it is a matter of more complete Government inspection, other than to insure that the proper inspections are made, and that every reasonable inspection of the equipment is made before it is used. And I firmly believe that in most cases that is done. In many cases we have found beforehand violations, irregularities, and what not, that have been corrected right on the spot. But we have not been able to find them all.

Mr. WOLVERTON. Without in any way directing criticism to any particular individual or authority, bureau, or company, the answers that have been made here today leave me very definitely with the opinion that this question of inspection, preflight inspection, at least, has not been considered with the seriousness that I think it is entitled to have. I can only speak for myself. There may be others on this committee better informed than I am. That is my view, at any rate, on the basis of the answers that have been given here today.

Mr. HENSLEY. Well, sir, I share your concern, and I did not mean to minimize the importance of the inspection need at all. I was thinking of the more practical consideration of the manpower available for use in these inspections.

Mr. WOLVERTON. You speak of limited manpower. If that is a matter due to lack of appropriations, I would like somebody to say it right out loud, and give some basis for this committee to make an effort to see that enough appropriation is granted to cases such as I am referring to.

I do not want it said that we have lack of air safety because of a failure upon the part of the Congress to provide adequate funds with which to do it. And if that is the case, I want to know it, for I want to be one who will raise his voice in the Congress to provide the appropriations that are necessary. If they are not provided, then it would be the responsibility of Congress. But it is not, until it is put up to them that that is necessary.

Mr. BECKWORTH. Mr. Mack?

Mr. MACK. Mr. Hensley, I think it would be of interest to the committee for you to inform us of the inspection requirements for air carriers. I think, unless I am mistaken, you were going to do that a minute ago.

Mr. HINSHAW. I would like to ask likewise as to the requirements for the scheduled and the nonscheduled carrier.

Mr. MACK. That is fine. I would like to have both of them.

That would also include periodic inspections, would it not?

Mr. HENSLEY. Yes, sir. I had in mind giving you in as much detail as you care to have it the various inspections that we make of the carriers' operations, or the various parts of their operation. I may give you an example. First, if I may pick up the irregular carriers' operation and the inspections we make of that, we first ask that the region responsible for the issuance of the certificate to an irregular carrier see to it that we have 1 en route inspection out of every 15 trips made in that area. In other words, we ride one en route inspection to make sure that the procedures are followed and the requirements complied with.

Now, we do have less active carriers that do not make very frequent trips, and in that case we require that they inspect the operation on one en route inspection every 3 months. That is the frequency with which we observe the actual operations of the carrier.

Mr. MACK. Is that inspection generally made by the same person, for one particular line?

Mr. HENSLEY. I would say generally that it is made by the same person. Our method of supervising the carriers is by assignment of a particular agent to serve a particular carrier, to get to know their particular problems. He is the responsible agent, so that we can know who is responsible by name for a given carrier's operation. That is, he is the agent held primarily responsible for seeing to it that this carrier does comply with the applicable rules. Generally, it is by the same person, but it is not limited, of course, to that person.

Now, particularly on irregular operations, where we have no foreknowledge of where they may go, it is the duty of other agents to conduct certain en route inspections at the request of the resident agent.

I can go on, if you like and give some examples of the frequency with which we observe other portions of the operation. In the case of the air carriers' training program, we ask that it be given a fairly complete review once every 3 months, to see that the training program approved for that particular carrier is being followed.

That is done by sampling the records, and of taking a particular pilot, and following it on through, together with conducting, or riding with him on a 6 months' check, to observe the results of the training program.

Mr. MACK. Is this for regular carriers?

Mr. HENSLEY. I am speaking of the irregular carrier at the moment. I can come back and give you the scheduled later, or handle it either way.

The flight records are reveiwed to see that use is made of the personnel, and to insure that the proper records are maintained. These checks are usually picked up during an inspection covering the individual trip records of the pilots, which are reviewed once each month. The individual airman records are inspected, insofar as their qualifications go, to see that they are up to date and maintained so as to show their qualifications for use on a particular route or type of flight, and to see that flight limitations are complied with. These records are reviewed on a frequency of 3 months.

Now, in addition to these recurring inspections the irregular air carrier is subject to an annual review, which, in effect, is a dress rehearsal of the original certification, where all things are reinspected to see that they meet the original requirements for certification. Now, the annual review is quite comprehensive and is called a renewal inspection, and is required annually.

But we place most importance, I think, on the actual review of the dispatch procedures used by the company, the en route qualifications, and the pilot inspections. Of course, there are many other items of inspection. I picked out some that were obvious, here, on a recurring basis, monthly, quarterly, or in the case of the renewal, on an annual basis.

Mr. MACK. Do you have a report of any kind, an over-all basis, of the results of your spot inspections, as to the regular carriers and how they are complying with the regulations, the qualifications of the pilots, and things like that?

Mr. HENSLEY. I don't know that I can give it to you exactly that way.

Mr. MACK. I mean, it is made available to, say, your office?

Mr. HENSLEY. Oh, yes. If you are interested, I may give you a quick rundown of a rather special inspection that we set up and required, during the Christmas holiday period. It was a concentrated special inspection, unannounced, to make as many inspections as we could, in order to see what compliance we did have. If you like, I can run down the results on that.

Mr. MACK. I do not think we will take the time for that.

Mr. HINSHAW. Could you ask him about checking pilots, their 6 month's check?

Mr. MACK. Do you have that, Mr. Hensley?

Mr. HENSLEY. I will tell you what we were after, here. I am reading briefly from a wire that went out on the 31st of December. It reads as follows—this is to our regional administrators in each of the seven continental regions:

> Request you give special emphasis to inspection of C–46 irregular passenger operations by using every available operations and maintenance agent who is at all familiar with C–46 aircraft and disregarding regular assignments and office hours for next 3 days: (1) Make as many inspections of C–46 operations as possible, (2) inspect for full compliance with all engine inspection and overhaul periods, (3) to fullest extent possible witness engine run-up prior to take-off to insure proper operation of engine and equipment, (4) check for overloading of aircraft, (5) in all cases where aircraft is found overloaded or inspection or overhaul periods are exceeded ground aircraft unless deficiencies are corrected and file violation reports, (6) send W 270 brief report all inspections made next 3 days. Desire to insure all C–46 passenger operators are maintaining thorough and adequate engine and aircraft maintenance and inspections.

Now, here are the results of that, in general. This program disclosed a total of 399 discrepancies, which resulted in 12 violation reports. These range from damaged seats, poorly stored baggage, slight oil leaks, overflowed oil tanks, and a loose ground strapping between flap and ring, up to mechanical irregularities which were cause for grounding one aircraft for 17½ hours until mandatory repairs were made.

Mr. BECKWORTH. That figure was three hundred and what?

Mr. HENSLEY. Three hundred and ninety-nine discrepancies.

Mr. BECKWORTH. All right. How many planes were looked at in order to get that 399?

Mr. HENSLEY. I don't believe I brought that figure with me, and I don't remember it. It was a substantial number.

Mr. BECKWORTH. You can supply that?

Mr. HENSLEY. Yes.

(The information referred to is as follows:)

Four hundred and twelve inspections were made over a 3-day period on 68 airplanes—202 were aircraft airworthiness and maintenance inspections and 210 were operational inspections.

Mr. BECKWORTH. And I wonder if you can give us the information we indicate, as to how many of those discrepancies pertained, we will say, to one or two individual planes. In other words, did one plane have as many as 15 or 20?

The figure like it is, is not too meaningful. It would have to be, as I see it, applied to individual planes in order to get the significance of safety. You see what I am driving at, do you not?

Mr. HENSLEY. Yes, I know what you are driving at, and I am embarrassed by not having the figure here. I will just have to furnish it to you.

Mr. BECKWORTH. Then try to give a practical application of the discrepancies in such a way as to show whether or not there were many of them that could possibly have resulted in serious consequences.

Mr. HENSLEY. Well, we have made a rather searching analysis of the results.

Mr. BECKWORTH. You can furnish that for the record?

Mr. HENSLEY. Yes, sir. I will provide that.

(The information referred to is as follows:)

There was no fixed pattern relating the number of discrepancies to the number of airplanes. A few airplanes had up to 10 minor discrepancies. A large number had from 1 to 3 minor discrepancies, and many had none at all.

An examination of the records indicates that of the 399 discrepancies noted, only 2 could be considered as serious (i. e., could have resulted in an accident). Corrective action was taken in all cases before the flights were released.

Mr. HENSLEY. I just thought that was a little interesting insight.

Mr. HINSHAW. How many incidents of overload were cited?

Mr. HENSLEY. I believe that was nine, sir.

Mr. HINSHAW. Nine?

Mr. HENSLEY. Yes, sir.

Mr. HINSHAW. Any of them serious?

Mr. HENSLEY. Yes. There was one. May I read this next paragraph in this summary report? I believe it is interesting.

Overload irregularities covered before flight were noted as discrepancies, although in each instance the crew ordered fuel drained from the tanks in order to bring the gross weight down to the allowable limits.

In other words, they reduced the fuel, maybe in the one case of a few hundred pounds in order to get within the gross limits. In following through and checking the actual weight of the aircraft, these discrepancies in overload were noted, and in accordance with our dispatch the aircraft would not take off until they were corrected. Now, their correction obviously, in some cases, was to reduce fuel, thus reducing the load of the aircraft.

Mr. HINSHAW. And also its legal range.

Mr. HENSLEY. Well, it was our business, of course, to see that what was left in the way of fuel was adequate for getting to its destination

with the necessary reserves. That is, it was adequate for the flight, and the requirements observed, of course.

Each such reported instance—

this said, meaning again the overload irregularities—

indicated that the amount of overload was 300 pounds or less. Several reports indicated that aircraft were dispatched from other points with improper manifesting of fuel. In one case it was estimated by the agent that the overload could possibly have been 1,600 pounds, and in a third case, at the other extreme, there were 794 gallons aboard the aircraft at the beginning of a 4-hour flight, and there should have been approximately 200 gallons left at the conclusion.

I think that was the one where the agent couldn't find any gasoline in the tanks to speak of when the airplane arrived at its destination, meaning that the reserves required just had not been complied with.

So it was an interesting program, and we have gotten a lot out of it and have been able to snub up our procedures, following through both to assist the operator and to insist that he comply with the rules. And that is the way we see our job.

Mr. MACK. Is it not true that these nonscheduled operators know in advance the time that they are going to be spot checked by a representative of the Civil Aeronautics Authority in most instances?

Mr. HENSLEY. That may be true. I don't know that I have ever given the matter too much thought, as to what practice we might have. I think it may be a courtesy to the carrier, in a way, to advise him that we will be there, or to find out perhaps if what we want to look at is going to be available. I think we do have to remember that we are talking about a little different kind of an operator, than with an established air carrier. Many of our irregular operators only have two, one, three, or four aircraft. It is not a big fleet and always available for inspection. If he only has two aircraft, and they are both doing business, there is not much in the way of aircraft to inspect.

Mr. BECKWORTH. But do you not believe that any time you give any one of them notice that you are coming, certainly if he considers your agency seriously, if he has much confidence in your being firm, he is going to get things in order?

It appears to me that that gets out of the realm of a spot check, pretty much so.

Mr. HENSLEY. Well, I didn't mean to imply that we always advise him that we are coming. We don't. I might say that when I have used the term "spot check" it is a term that we have attached to a sample inspection. But in one instance, I might bring up here, we conduct a so-called ramp check on the irregular carriers that cannot possible give the operator advance notice. It is just a question of walking out on the ramp. That is where it got its term. We walk out on the ramp and say, "I want to inspect this airplane."

Mr. MACK. Does that involve weighing of the aircraft?

Mr. HENSLEY. No, sir; it normally does not involve actual weighing of the aircraft.

Mr. MACK. You check the manifests?

Mr. HENSLEY. Manifests and loading schedules. We stick the tanks. We don't do this in the office, with some papers; it is actually looking at the aircraft and sticking the tanks to see how much gas we

actually have and how much load is involved. So it is not a paper calculation, but a verification of what we have in the way of loads in the gas tank, verified and calculated from the load schedule and manifest.

Mr. MACK. We can go much further on that, but I think it would be of interest to all of us if we moved on a little further, on other inspections that are required. I mean, I also want to include that. I do not know about your air carriers. I know I have to have my little plane inspected occasionally, a hundred-hour check, and so forth.

I would be interested in knowing, and I think the committee would, as far as the air carriers are concerned, what are the requirements generally for major inspections, the inspections other than your preflight schedule that we have been discussing here?

Mr. HENSLEY. Well, if I may speak generally, and I think it should be general, since it may vary both with the equipment being operated and with the way the carrier chooses to operate it, when a piece of equipment is put into service by the carrier, there is beforehand established, in collaboration with the operator, the manufacturer of the equipment, and the CAA, inspection periods and overhaul times for all components of the aircraft, all equipment, all parts. That requirement is set forth in the operator's manual, as his inspection system, his over-all system, and the times when each of these parts and components will be inspected, will be replaced, or otherwise adjusted. Some of the carriers use a 30-hour check, some a 40-hour check, as the first inspection you might say. It has taken the place somewhat of the old 25-hour inspection that you may be familiar with, that we used to have.

Then they go from there to another check, which may be in the neighborhood of, between 60 and 80 hours. And from the inspections, then we get to the overhaul periods that have been established both for the engines and the airplane structure itself or various major components of the airplane.

So those are established beforehand, and once they are approved and agreed upon are incorporated in the operator's manual.

Now, he has responsibility for carrying out those inspections, the same as you have as an aircraft owner for having carried out your hundred-hour inspection. It is the same kind of responsibility. It is their responsibility, and it is our responsibility to assure that the system works, that the carrier does comply. That is generally the way it is set up.

Mr. MACK. Then the operator's manual for any certain type of aircraft would specify the number of hours, the limitations, the way the airplane could be operated. And at the time of this check, whether 30 hours, 40 hours, or 50 hours, that would be considered a major check, similar to the one I have, into the hundred-hour period; is that correct?

Mr. HENSLEY. Well, it could be equivalent to that kind of inspection, yes. I mean, I believe we used to have 20-, 50-, and 100-hour inspections, but sometimes we wear a thing out by inspecting it, taking a thing apart and putting it back together.

Mr. MACK. I definitely remember the 25, 50, and 75, was it not, years ago?

Mr. HENSLEY. Yes, there was a 25 hour, 50 hour, and then a hundred. Obviously, that placed one also at the 75-hour point, which was another 25.

Mr. MACK. If I recall, the 25-hour inspection was not much more than a preflight inspection. The hundred-hour inspection was, I would say, a major inspection.

Mr. HENSLEY. That is correct.

Mr. MACK. Certainly, the spark plugs would all be pulled out, inspected, perhaps replaced. And that is the type of inspection I am talking about now.

Mr. HENSLEY. That is correct.

Mr. MACK. And you say that inspection varies with the aircraft being operated, and that you would estimate that most of the airplanes operating in the air carrier service have inspections about 30 or 40 hours?

Mr. HENSLEY. Well, I would like to substantiate those figures.

I am speaking generally. But that is the area; yes, sir.

Mr. MACK. Very general terms?

Mr. HENSLEY. That is the area.

Mr. MACK. But there is definitely this inspection that comes up at some period, you would say, between 30 and 60 hours. That is a major inspection. And at that time an employee of the operator would inspect such things as spark plugs?

Mr. HENSLEY. May I ask a question, back here, to answer your question?

Your inspection of the plugs in a preflight is the only actual inspection until we get to the overhaul time of plugs, which I understand runs from in the neighborhood of two hundred on up to four or five hundred in the cases of different plugs.

Mr. MACK. I am not familiar with your preflight inspection of spark plugs, then. Do you mean to say that in every preflight they pull all these spark plugs out?

Mr. HENSLEY. No, sir; that is just an inspection without removal. That is not an actual inspection of the whole plug itself, removed from the cylinder.

Mr. MACK. And that plug might not be removed, then, for 300 or 400 hours?

Mr. HENSLEY. That is right.

Mr. MACK. In line with what Mr. Wolverton was asking about the spark-plug inspection, as to the type of spark plugs being used, I do not think preflight inspection would ever cover that. But I do think you could place responsibility upon a mechanic for putting the wrong type of spark plugs in at a certain point or in a certain inspection, or if they had been put in by somebody else, this inspection should require them to check the spark plugs to see at that time whether they had the right kind of spark plugs and whether they were good plugs; in other words, really test them. I am free to say that when I checked the spark plugs in my plane several times in the short tour I had, I felt it was most important to do so. And I thought that Mr. Wolverton was under the impression that they actually pulled the plugs out and checked them in this preflight business you were talking about.

Mr. WOLVERTON. No. I am not familiar enough with the location of spark plugs in an airplane machine to know whether you could do

it as well by visual observation as you could in an automobile, or not. I do not know that.

Mr. MACK. I wanted to ask one other thing about this.

In the case of this C–46 that cracked up, where it was determined that they had the wrong kind of spark plugs, was there any loss of certificate after that accident, or was any action taken?

Mr. HENSLEY. I am sorry. I canont answer of my own knowledge. I can certainly check and tell you whether that was the case or not, and if not, why.

Mr. MACK. That was the reason that I asked about the periodic inspection.

Do you not think it would be advisable to have them check the spark plugs on this periodic inspection of 30 hours or 40 hours, or whatever it is?

Mr. HENSLEY. To actually remove the spark plugs at that time and inspect it?

Mr. MACK. And check it. That is right.

Mr. HENSLEY. No, sir; I do not think I am qualified to say whether it would be advisable or not. It is removed when it is, I think, because by rather long experience it has been found that plugs properly installed in the first instance, and I mean with the wire attached, and so forth, are serviceable for that period of time. Again, it may be a question of wearing the plug out by taking it out and putting it back in too many times.

But I think we have the experience to indicate that it need not be removed and checked more frequently than that.

Mr. MACK. In the case of this Puerto Rican accident that has just been called to my attention, where the investigation disclosed that improper spark plugs had been installed immediately prior to the subject flight, I think that was done by a representative of this carrier. Certainly some action should be taken there.

Mr. HENSLEY. I recall the incident. They were having spark-plug trouble and arranged to obtain a new set of plugs for the engine that had been giving trouble. And when they arranged for a set of plugs for the engine, it developed it was just the wrong type of plug for the engine. That I will have to say I believe it the responsibility of a responsible person of the company, to insure that the proper type of plugs was obtained for the particular engine.

Mr. MACK. Well, in the case of the airlines, these mechanics get what they consider fairly good pay. And I think if they did have their certificate withdrawn it would certainly make them more cautious.

Mr. HENSLEY. We do that. I mean, the airman as a general category is our responsibility; not only just pilots.

While we think generally of pilots, it also includes not only the air crew but the mechanic and other types of airmen that are certificated or required to operate under the terms of the certificate.

Just in passing, I might say that the particular company, including the individual that authorized the purchase and installation of these plugs—the whole company has ceased to exist. Their certificate was revoked; the whole company, including the management. In that case, a case of installation of the wrong type of plugs, the company official just failed to discharge his duty. That was the only thing

I could see that might have happened there. He did not pay the proper attention to assuring that the right kind of plug was provided. Or if he did, then he allowed an improper inspection to be made, and allowed the mechanic to go ahead thinking perhaps he could get by with it.

Mr. MACK. Getting back to your other statement, of wearing out the plugs, as I recall, or as someone mentioned, the life of the plug is less than 500 hours. Is that correct? Or am I incorrect in that statement?

Mr. HENSLEY. I would like a little advice. It is my impression that that is not correct. It requires an adjustment, I think, at some point of two to four hundred hours, but that would not necessarily be the life of the plug.

No; it is a question of overhaul in this two- to four-hundred-hour period. They are removed, overhauled, the points adjusted, and they are otherwise cleaned up and reinstalled, not necessarily in the same engine, or else they are discarded from service if they do not test up.

Mr. MACK. I had concluded that after a 500-hour period the majority of the plugs would be replaced.

Then, as to the wearing a plug out taking it out and putting it back in, if you were taking it out and putting it back in five times in 500 hours, I know that I have experience of many plugs that have been taken out and reinstalled in that manner and continued to be used.

Mr. HENSLEY. I did not mean to imply that on the regular inspections they would be worn out. I think we were talking about a preflight, before each flight.

Mr. MACK. Oh, I know it is not practical or feasible to take a plug out each time, and in fact I do not think you need see all the plugs when you check preflight in a plane.

I wanted to ask about this manifest. I understand the loading schedule is important for the weight distribution on the plane. But the manifest, as I recall, has the empty weight of the airplane, the weight of the gasoline, the cargo, the weight of the cargo, the passengers, and the total gross weight of the airplane. Now, that is required by civil air regulation.

Mr. CHAMBERLAIN. Yes, sir.

Mr. MACK. That a manifest be made by any air carrier prior to flight.

Mr. CHAMBERLAIN. That is correct.

Mr. MACK. Now, is there any requirement that that manifest be forwarded to any Government agency?

Mr. CHAMBERLAIN. I can quote the pertinent regulation, if the committee wishes.

Mr. BECKWORTH. You can answer that, can you not, Mr. Chamberlain? You know whether it is required that a copy be forwarded to a Government agency, surely?

Mr. CHAMBERLAIN. I think I can answer it by saying, "Yes," but I do not want to answer it incorrectly, here. I might just quote the last sentence of this paragraph, which is pertinent to that point, I think. The requirement says that the assigned copy on any revision of the flight manifest required by the basic paragraph in this part shall be retained in the personal possession of the pilot for the duration of the flight, and a duplicate copy thereof shall be retained by the

air carrier at its principal operations base for at least 1 year after the completion of the flight.

Mr. MACK. The answer is "No," is it not?

Mr. CHAMBERLAIN. The section I started to refer to had to do with intermediate stops where passengers may be put on or taken off, and was not quite to the point to which I thought it applied. That is why I hesitated.

They do not send it to the Government. They have to retain it in their files, subject to inspection by Government inspectors, CAA.

Mr. MACK. Now, is there any periodic inspection made of these manifests, other than your ramp checks?

Mr. HENSLEY. Well, yes. It is a review of all of the records in the interim operation between this required 3 months' period. Now, I might explain that a little. The frequencies I have stated are the minimum that we want our agents to make these inspections whether they be 6-month checks, or training program, or what not. But they have to use considerable judgment, too. When they find an operator that is not anxious to comply, they may have to give more attention to his operation and make more frequent inspections. There is no limitation on the frequency of any of these inspections.

Now, we do frequently find the small irregular operator doesn't maintain an adequate bookkeeping system or doesn't pay sufficient attention to the records-keeping portion of his business. So we have to work with him and make more frequent inspections than would be necessary where he had a good system of record keeping, that was working; meaning that when we find noncompliance or some ignorance of what is required, it is up to us to visit him more frequently, be a little more insistent, and help him, if you like, to develop the record-keeping system that is required, and then insist that he keep it that way.

Mr. MACK. Well, what do you think would be the effect if you required them to furnish the Government with a manifest for each flight? Do you think they would furnish you with an accurate manifest from the time they took off?

Mr. HENSLEY. You mean prior to flight they would furnish a copy? Or subsequent?

Mr. MACK. No. Would they just make it available to you? In other words, for each flight, furnish you with a manifest?

Mr. HENSLEY. Sir, it is available to us any time we want to see it, before the flight, as soon as it is made up, or during the making of it, or any time thereafter for the period of a year that they are required to maintain it.

Mr. MACK. Suppose they were required to send you their manifests once a week?

Mr. HENSLEY. My first reaction to that would be that it would be quite awkward to handle.

Mr. MACK. Was there a manifest in these five accidents? There was a manifest made out for those flights?

Mr. HENSLEY. Oh, yes.

Mr. MACK. Now, if they did not have an accident, you would have received these accidents? And were there four of them that were overloaded, over the limit, or five?

Mr. HENSLEY. There were three or four that were overload; yes, sir.

Mr. MACK. Now, if those manifests had come into the Civil Aeronautics Administration, you would have filed a violation on it. Am I correct in thinking that?

Mr. HENSLEY. Well, that was done, yes, sir. You see, the manifest is retained by the carrier and is subject to our review. It is a part of our job to review the manifest. I may miss your point, but they are, you might say, the equivalent of being sent to the Government, although not officially so. They are retained in the files for review for that purpose.

Mr. HINSHAW. I do not believe the gentleman was present at the time the first hearing was held by this committee in Newark, at which time I believe it was the city prosecutor and it might have been one of the other gentlemen who pointed out that the irregular air carrier involved in the first major air accident had been cited for overloading on a good many occasions. I forget the exact number of citations, but it was said that they had at some earlier time paid a fine of something like $150 for two violations and at a later time paid a $1,500 fine for a group of violations, all of which were discovered by the Inspection Service of the Air Carrier Inspector. And obviously some inspection had been made of that carrier, or the violations would not have been known.

Mr. MACK. That is exactly my point. It appears to me—and I was not present at that time, but I so concluded—that the ones that do not have a crack-up do not make an issue over the overloading of the aircraft. And it appears to me there are many flights made every day where the aircraft is overloaded.

Mr. HENSLEY. I am forced to admit that. I am rather certain that it is being done, some of them through an honest mistake, a miscalculation or a misloading of the aircraft, some of it I am inclined to think willful, and much of it I think we are able to catch up with and prevent. And I can't sit here and suggest to you that I don't think there is any, because I think there is.

Mr. MACK. You do not think it would be any better to have the manifest sent to you than to have your man go out and inspect them?

Mr. HENSLEY. Well, no, sir. To answer your question, I cannot at the moment see the advantage. I certainly would have no reluctance, if we accrued an advantage, to following that procedure. I would be delighted. But at the moment, I do not see the advantage.

Mr. MACK. I was quite concerned at this manifest issue, because I knew that they were being made out for each flight, and yet it appears that no one has been taking any action when they do have cases of overloading.

Mr. HENSLEY. Oh, no, sir; we do take action, if I may say so, when we can find and prove cases of overloading. And if I might recite to you just quickly and generally a procedure we follow: In an irregular operation, the carrier, of course, buys gasoline at various stops, and at each stop he is required to execute a new manifest for that particular leg of the flight, and he may go to a dozen places before he gets back to his main base in his operation, since he is an irregular carrier. Now, he is required to substantiate his manifest not only with the loading schedule but the gas that was actually put aboard and the number of passengers, the cargo, and what not, that were included.

So one method that we use in checking that is to start the carrier from his main base, where he is known to begin this flight away from

home, with his manifest and the loading schedule he started with; then, to proceed to the next leg of his flight, to ask him to produce the gas records and match those with the load that was included on the manifest for the next leg of his flight. By calculating and allowing for the amount of gasoline used, we can rather accurately determine the load actually in the aircraft at the next stop, and the next, right on around the circuit back to his home base. In this way we can verify the load that was computed to be in the aircraft with what we believe to have been actually aboard the aircraft. We have found a number of violations of overloading errors in that way.

I have to admit that is not the way we would like to do business, since it is closing the door after the horse is gone, but it is a way of digging into that practice. And if we find a carrier to be doing that, either through ignorance or willfully, at least we can get him straightened out, provide for him an opportunity to comply, and if he continues such practice it becomes an enforcement case.

Mr. Boyle just prompted me to say, and I do know, that we have four complaint cases pending at the moment on just such a thing as this.

Mr. MACK. I would be the last one to want to make it more complicated and more difficult for air operators and the pilots, but in many countries I have been in, although carrying no cargo and passengers, I had to fill out a flight manifest before I could get clearance to take off from the airport. I don't know where the manifest went in each country, but I must say that in some places I had to make out three, four, or five copies of the manifest before I was cleared to take off. And it was something in that line that I had in mind here.

I was of the impression that a copy of that manifest was going to certain air authorities in the country I was in. And I thought perhaps you had the same procedure here, of forwarding these manifests to your office where a clerk could look down the manifests and pick out the ones that were overloaded on certain days. It would be a very simple procedure to contact them.

I am not very familiar as to what action you have taken in those cases. Do you investigate each one individually, when you pick them up on your spot checks?

Mr. HENSLEY. Many of them are picked up individually, yes, sir; on the ramp inspection. In other words, well, we will want to pick up this airplane, and we will just walk out and follow on through, making up the manifest, or, say, "Let's have your manifest from your last departure," and go back and stick the gas tanks and find out right then and there whether there was an overload.

The other I will have to call a back-tracking procedure, but it is a way of determining whether the carrier is actually following his manuals and his loading schedules as far as conducting his operations is concerned.

I think it might be excusable occasionally if he does make a mistake, or just rarely would by chance overload his aircraft, but not a common practice; but when you find it several times, I think it ceases to be an error and can be called a common practice which we will just have to stop. In such a case I think our inspections of that carrier would become more frequent and intense to make sure that we did in fact have compliance and there was no overload.

Mr. MACK. I have no more questions.

Mr. BECKWORTH. How many inspectors do you have in all, people that you call inspectors, in the CAA?

Well, you can supply it for the record. I do not want to unduly delay the committee.

Do you have any idea how many inspectors there are here in Washington, say, at the National Airport?

Is it once a week, or do you have an inspector there all the time?

Mr. HENSLEY. Yes, sir; we have several here. Right at Washington National Airport we have what is known as an air carrier safety office, where there are seven resident inspectors or agents.

Mr. BECKWORTH. I wonder how many inspections a day you make at the National Airport. Supply that for the record, if you will.

Mr. HENSLEY. All right, sir.

(The information referred to is as follows:)

CAA has a total of 586 aviation safety agents (inspectors) assigned to field duty. By technical specialty, there are 156 airman agents; 198 flight-operations agents; 118 aircraft-maintenance agents (personal aircraft); 92 air-carrier-maintenance agents; 22 air-carrier-maintenance (electrical-electronics) agents.

Of this total, there are assigned to domestic air carriers: 80 operations agents; 78 maintenance agents; and 20 maintenance (electrical-electronics) agents.

These agents conducted 181 inspections of various kinds between February 3 and February 14, 1952, which is an average of 18 inspections per day at the Washington National Airport. The kind and number of inspections made during this period were:

En route inspections	10
Observing 6 months' instrument flight checks	4
Inspection of air carriers' training program	10
Inspection of the air carriers' operations and maintenance manuals	13
Inspection of the air carriers' flight records	1
Designation of air-carrier check pilots	2
Review of runway-restriction data and procedures used on downwind landings	2
Airport inspection	1
Operations and maintenance station facility inspection	2
Application for amendment to the air carriers' operations specifications—airport	20
Operations and maintenance ramp/spot checks (irregular)	1
Operations and maintenance ramp/spot checks (scheduled)	18
Review of daily mechanical reports	5
Consultation with the operators regarding communication procedures	23
Maintenance subcontractor facility inspections	3
Logbook inspections	21
Analysis of mechanical and radio electrical reliability reports	11
AD compliance inspection	3
Consultation with the operator regarding maintenance procedures	22
Accident investigations [1]	4
Violation investigations	3
Traffic and taxi-pattern inspections	2

[1] A total of 133 hours was devoted by one operations agent and one maintenance agent of this office to the investigation of two Capital Airlines' accidents (Cleveland, Ohio, and Charlotte, N. C.).

Mr. BECKWORTH. Do you know how many inspections you make a day at, say, Newark Airport?

I thought possibly you might have checked on it since the accidents.

Mr. HENSLEY. No, sir. It is rather difficult to answer those questions. I don't want to appear to be avoiding them. But there are various kinds of inspections made, not only at the particular point, but air-carrier-wise it is mainly a system type of inspections throughout their system rather than a matter of waiting for some to go in and go out.

We are also interested in the carrier's facilities at the other end of the line, besides this end, and I think I can make a good calculation of the number of inspections made.

Mr. BECKWORTH. Try to make those calculations and give them to us as specifically as you can.

Mr. Hinshaw mentioned a while ago that the prosecutor there in Elizabeth read out a good many violations by one of these companies that sustained the tragic loss there. As I recall, a good many of those violations were very close to each other.

What is the general policy about clamping down on an airline that you catch violating your rules and regulations frequently, all within a short period of time? Do you have any positive regulation along that line, or is it all just optional?

Mr. HENSLEY. I think the matter of enforcement or compliance is, shall I say, a policy type of thing rather than one of regulations. The regulations obviously say, "Here is the rule. You are required to comply with it."

Now, it is the Administrator's job to see that that is done. My idea of enforcement is one of compliance seasoned with some degree of education. What I mean by that is that what we are after actually is compliance. We are not after the policeman-type of enforcement, "Do it or else." I think it is part of our job to seek that enforcement through first being sure that the individual, the carrier, the operator, or whoever we are talking about, knows the rules. It is our business to see that he does know what the rules are, and any changes; so that if we can get compliance through education, if he cooperates and willfully does comply as soon as he knows what he is supposed to do, then we have done our job, and he has a good operation.

When we get to the operator who consistently violates, cuts corners, takes chances, and does other things that are not in compliance with the regulations or established good practices, then I think our policy generally is to be sure that he does know what is required of him; that we do know that he has not been complying and expect him to conform thereafter.

Now, if we have his cooperation, and he gets on the ball and complies, fine. If he persists beyond that to violate further, then we take steps to file formal charges of violation and take whatever action might be pointed up by the type of violation involved.

Mr. BECKWORTH. Here is an example of what I am talking about, according to testimony taken.

One of these airlines, on April 14, 1950, or a carrier, I will say, on April 14, 1950, Miami, Fla., to San Juan, P. R., overload; on April 18, just 4 days later, Miami, Fla., to San Juan, P. R., overload; on April 23, 1950, Miami, Fla., to San Juan, P. R., overload just 5 days after that; April 27 1950, Miami, Fla., to Caracas, Venezuela, overload.

Now, that was just 4 days later.

Do you have any positive policy? And, by the way, there are some more very soon thereafter, and about the same number of days removed from each other. Do you have any positive policy as to what to do with the carrier that is violating your rules and regulations that rapidly?

Mr. HENSLEY. Yes. Maybe you would prefer to hear Mr. Boyle testify on enforcement policy. It is more in the general counsel's

baliwick. Our policy is to crack down, so to speak, and insofar as overloading is concerned, to take certainly all of the profit out of any overload that might exist, and also insure that we have complied with the safety requirements.

Mr. BECKWORTH. Well, you would not in any manner contend that all those overloads were as a result of ignorance or a failure to know what the rules and regulations were?

Mr. HENSLEY. Well, no. I would have to agree that all of them were not that; no, sir.

Mr. BECKWORTH. Well, that pattern, and it is a pretty long pattern, if it is accurate would indicate that certainly the officials must have known what they were doing.

Mr. HENSLEY. I agree, sir. It indicates a sloppy operation. I agree with you.

Mr. BECKWORTH. Now, that is getting to my point. When you see an operation like that, is there any tendency on your part to say: "Now, listen; until you correct your habit of breaking our rules and regulations every time you fly, you are not going to fly any more"? Do you have a regulation of that kind, or do you have a policy?

Mr. HENSLEY. We have a policy, a very definite policy, to do just that. We find the trouble. We go to him and sit down with the operator—the management of the company, I am talking about—and go over the deficiencies we have found, and be sure that he understands, depending, I think, on the seriousness of it. But that is the first move. Then it is put in writing, so that there is no doubt that he knows. And his complete compliance from then on out is requested. After that it becomes a matter of taking enforcement action. I might say that phase of it is this educational matter of compliance that I spoke of, to be sure he knows. After that it is a matter of enforcement.

Mr. BECKWORTH. Within 12 or 15 days, if you get an operator four or five times, he certainly knows what he is doing, undeniably. He just could not forget that rapidly.

Mr. HENSLEY. Well, sir, I will have to agree with you, and I know what you are talking about, except this, now: I am not excusing myself, but so that you will understand it, too, this may have been one of these trips that goes a long way around a circuit before it gets back home. And until we pick up and find this practice on the part of the carrier——

Mr. BECKWORTH. That brings up a question I wanted to ask you, not exactly related to what has been talked about, but how often do you run into a situation where a plane takes off, we will say, from Washington, and wants clearance to Oklahoma City, and then, as it approaches Oklahoma City, it gets some kind of permission to go into Denver.

Mr. HENSLEY. I am sorry. I am not close enough to that problem to be able to answer it. I will attempt to find out.

Mr. BECKWORTH. You might see what you can get on that.

Any other questions?

Mr. HENSLEY. Mr. Chairman, may I ask for just a point of clarification on what you want on that last question to help me get you the information you want? I don't see anything wrong so far with the change of flight plan, if that is what you are talking about.

Mr. BECKWORTH. That is what I am getting at. Does that become a habit for evasive purposes? Has it been observed. Or is it something that really is not of consequence?

Mr. HENSLEY. Again I don't mean to be asking too many questions, but are we talking about an economic thing, or safety?

Mr. BECKWORTH. Well, just answer it both ways, as far as that is concerned. I just want to know if it occurs. Have you run into that kind of thing?

Mr. HENSLEY. Well, yes. I might give you some past experience with that. I think it is to a large extent corrected now. I do know that a couple of years ago we had, I think, quite a number of cases like that. It was practiced in order to avoid an economic regularity rule, where the two points served would be a violation of the regularity rule; so that they did file to this place and get back to the other place.

Mr. BECKWORTH. The point that comes into my mind: At the time the flight originates and the clearance is given to a given place, it might definitely be a safe flight; whereas if you extended it a thousand miles, it might get to bordering on the realm of being unsafe.

Mr. HENSLEY. I see your point. I will make a check for you.

Mr. HINSHAW. Mr. Chairman, in this statement in the record which we have, it shows that as to Miami Airlines, Inc., which I assume is a nonscheduled carrier, its first violation was February 18, 1947, a flight from Kingston, Jamaica, to Miami, Fla., lack of proper flight manifest, improper storage of cargo, and overload of 2,412 pounds; and it received a civil penalty; another violation on August 17 of the same year, aircraft not properly equipped for instrument flight, and so on, with again a civil penalty. Then there are other violations referred to purely as "overload," principally on flights to Puerto Rico, in a rather close series, indicating that possibly there was more or less of a schedule involved. Nos. 3 to 16, inclusive, were compromised for the blanket sum of $1,500. Now, there are 14 violations compromised for $1,500, or about a hundred dollars apiece. And those violations took place between April 14 and September 18, 1950, although almost all of them came before June 28, 1950.

It is not stated here what these overloads were, but apparently these cases have been compromised for $1,500.

The question that arises in my mind right off the bat is whether it was not cheaper for them to pay a compromise penalty of $1,500 and to go ahead and get away with all the overloading they could in the meantime.

Now, there are 16 violations noted. None of them are noted between August 16, 1947, and April 14, 1950. So presumably, either they did not violate any of the rules or regulations in that period, or they did not operate, or there was no inspection, one or the other, because of that great hiatus of some 3 years. Perhaps that has its explanation. I do not know. But do you mean to tell me that with 14 violations within a very few months you would be willing to settle for $1,500, an average of about a hundred dollars apiece? How are we going to control these carriers if they can get away with that that cheaply? I am sure you would not allow a scheduled air carrier to get off that cheaply, because I have heard of a stiff fine up to five or ten thousand dollars in the scheduled carriers, and yet here is a nonscheduled carrier that has come through with 14 violations in a row

and gets away with $1,500. I do not know how we can control things and keep loads within limits and keep operators operating within limits by any such deal as that.

Why should he not be prosecuted? Why should he not be turned over to the Civil Aeronautics Board under a complaint for 14 violations like that?

He certainly knew what he was doing. And that certainly is an invitation for him to continue, in my mind.

Mr. HENSLEY. Yes, sir; I am inclined to agree with you. I am not in position to answer your question right at the moment, of why a complaint was not filed for the revocation of his certificate.

Mr. HINSHAW. And, of course, right after that he killed 56 people.

Mr. HENSLEY. Yes, sir.

Mr. HINSHAW. Of course, an overload was involved in the accident which this airline suffered in Elizabeth. It was not a great overload. But it was a single engine operation.

Mr. BECKWORTH. We are sorry we have not been able to get further, but this has been an interesting and helpful session, I believe.

Mr. HINSHAW. I would like to say, Mr. Chairman, just before you adjourn, that that record does indicate that some inspection was made. The inspections were made, and the violations were found.

But what was done about them was minimal.

Mr. BECKWORTH. The committee will adjourn, subject to the call of the Chair, and we will hope to have both divisions back when we resume, which should be early next week.

Thank you very much, gentlemen.

(Whereupon, at 5:15 p. m., Friday, February 15, 1952, the hearing was adjourned, subject to the call of the Chair.)

AVIATION SAFETY

TUESDAY, FEBRUARY 19, 1952

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE OF THE COMMITTEE ON
INTERSTATE AND FOREIGN COMMERCE,
Washington, D. C.

The subcommittee met at 2 p. m., pursuant to notice in room 1334 of the New House Office Building, Hon. Lindley Beckworth (chairman of the subcommittee) presiding.

Mr. BECKWORTH. The subcommittee will come to order.

We are pleased to have as witnesses this afternoon Mr. Charles F. Horne, Administrator of the Civil Aeronautics Administration. We as a subcommittee are interested in the C–46 plane, and we would like to get more about the history of its use and certification, and we will be pleased to have you make a statement, Mr. Horne, at this time, or submit to any questions which any of the members might have.

STATEMENT OF CHARLES F. HORNE, ADMINISTRATOR, CIVIL AERONAUTICS ADMINISTRATION, DEPARTMENT OF COMMERCE

Mr. HORNE. My name is Charles F. Horne, and I am Administrator of the CAA. Mr. Chairman, in regard to the detailed history of the C–46, I would like some of my people to answer any specific questions on that. In a general way the C–46 was certificated after World War II in accordance with part 3 of the Civil Air Regulations. The normal certification of passenger-carrying airplanes for commercial purposes is done under part 4.

Now I myself do not have personal knowledge of why it was certificated one way instead of another, because that was long before my time, but I do have people here who can answer questions along those lines if that is an interesting part of your discussion.

Secondly, in a broad way again, the airplane was certificated, in accordance with part 3, for a maximum total of, as I recollect, 48,000 pounds gross weight. This was at that time thought to be the correct load because of certain tests which had been made for the operation of the airplane. However, subsequent operations convinced the CAA that this was too great a load and that the aircraft would not satisfactorily perform, particularly in case of some difficulty to one engine, with this load.

Consequently, the CAA made a number of very practical and complete tests about a year ago to determine just what this airplane would do in the way of performance. The results of those tests indicated to the CAA that the load limit should be reduced in connection with the safety of operations.

The CAA made the recommendations to the Civil Aeronautics Board that the gross load weight should be reduced. The Civil Aeronautics Board received these recommendations and their examiner held some hearings on them. Their staff studied all aspects of the C–46 case.

The CAB examiner then issued a report on his consideration of the facts presented to him. Then more recently, while certain questions were still in some doubt, as to whether the first tests were right or the second tests were right, the Civil Aeronautics Board took an emergency safety action to definitely limit the allowable gross weight as a temporary thing, pending the public hearings which they will hold.

The Board made the limitation of 45,000 pounds, and the airplane is presently operating with that limitation on it; and our people—our inspectors, and so forth—are seeing to it that the airplane is used with that limitation.

Now, that is a broad picture. I am desirous of answering your questions and at the same time seeing to it that I do not confuse the thing by too much conversation.

Mr. HINSHAW. We have under consideration in this committee the question, I suppose, as to what we might do, pursuant to whatever we may learn in connection with certain accidents which the committee has been caused to investigate. I personally am concerned, as one member of the committee, over this accident which took place in and near Elizabeth, N. J., in which a C–46 with certain difficulties in the right engine was forced to attempt a return to the airfield and in the course of that return cracked up in the city of Elizabeth.

In connection with the hearings held the other day, the committee learned from the representative of the Civil Aeronautics Administration that tests have indicated that this particular aircraft carrying a load of gasoline sufficient to sustain it for 4 hours would have a single-engine performance at the critical take-off point only sufficient to carry a part of one passenger, let alone a load of passengers, and at the same time conform to part 4 of the Transport Category of Airworthiness Regulations with respect to climb.

Now, it is a bit confusing to me as a member of this committee just why and how an aircraft with that capability—if that is what its capability is—should be certificated for the carrying of passengers at a considerably higher gross weight. I understand from the Administrator and from others who have testified that it comes under part 3, or came under part 3, of the Civil Air Regulations in respect to airworthiness in 1945 when it was first certificated, and that that part was a very indefinite sort of regulation, and that it was intended to apply to single-engine aircraft of a much smaller gross weight.

Is it correct to assume that part 3 has now been limited to a lower gross weight of aircraft than the C–46, such as 12,000 pounds or less?

Mr. HORNE. It has been the recommendation of the Civil Aeronautics Administration that aircraft of over 12,500 pounds gross weight should not be certificated under part 3 of the rules. We feel that any aircraft over 12,500 pounds gross weight which is going to carry passengers in commercial operations should be certificated under the same rules so that all large airplanes carrying passengers for

hire would have the same general rules of certification. We have so recommended, and we feel that that is a proper recommendation.

Mr. HINSHAW. Well, as the Administrator knows, there are other considerations in respect to aircraft and the safety of passengers, particularly in areas where airports are located adjacent to or even in the midst of congested populated areas, and that people on the ground are to be protected as well as people who are going to use aviation as a means of transportation. Has consideration been given to the possibility of limiting the aircraft which will not meet the transport specifications to airports that are not in congested areas?

Mr. HORNE. No, sir; no specific limitations of that kind have been discussed. The economic factors as to whether a particular operator should be permitted to use a specific airport would lie within the prerogatives of the Civil Aeronautics Board, I believe, if it were a question of the economics of the thing.

As far as the safety is concerned, the rules do not prevent a certificated aircraft from operating from an airport providing that airport has a sufficient length of runway under adequate weather conditions.

Mr. HINSHAW. Has that consideration been broadened to include a take-off or approach area which is sufficiently long and free of such things as dwellings or other obstructions so that the critical point of take-off could be passed and the aircraft still landed without damaging people or things on the ground?

Mr. HORNE. Not specifically in that way.

Mr. HINSHAW. Of course, this is somewhat of a hypothetical question, but I think we can well understand that an aircraft that does not have the ability to climb on one engine may, in fact, have a negative rate of climb, becomes almost a missile if it is required to perform on one engine at the critical point of take-off. Obviously it is going to crash somewhere. That is particularly if it has a negative rate of climb or if surrounding terrain is perhaps a little higher in elevation than the airport runway.

I wonder if consideration should not be given to, let us say, an aircraft becoming a missile if it does not have climb ability on take-off, with one engine going out at the critical point of take-off. I would like to know what you might think on that subject.

Mr. HORNE. I certainly think that you have a good point. I think the matter has been investigated, although I personally am not up at the moment on what investigations may or may not have been made on that exact point. I think it is a sort of thing that we could give you some further information on.

Mr. HINSHAW. It seems to me that recommendations should be made of some kind which will in this case protect people on the ground. That aircraft could take off with 48,000 or 45,000 pounds gross weight, the difference between its net and gross weight would be cargo rather than passengers and become just as serious a missile if it lost one engine at the critical point of take-off as though it were carrying passengers. It does not matter what it carries, it becomes a killer to those who are on the ground.

I am wondering whether consideration ought not to be given not only to its climbing ability but to that other characteristic of perhaps negative rate of climb under such conditions.

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Mr. HORNE. I feel a good deal of consideration has been given to that. We recognize that the critical point is just as the airplane is leaving the ground, when it is just becoming airborne, and that this very critical phase is rapidly passed through as the aircraft gains flying speed and gains a small amount of altitude.

Now, the particular effect that you have in mind, I think, is covered by the length of the runway and the overruns in specific runways, so that if this unusual and bad condition should occur just as take-off is being made, the airplane would come back down on the runway or in the overrun area. Once the airplane is actually airborne and at a safe altitude, then the tests show that it will fly on one engine. Now, the degree of flight on one engine and the amount of loading at which it will fly under certain circumstances and the degree of climb are the technical features which are under discussion and in which there is some disagreement among various expert technicians as to just what the loading is at which the airplane will do certain things. That is what the CAA has tried to determine by its tests, and that is what is contested by the operators of the aircraft.

Mr. BECKWORTH. Mr. Horne, right in that connection, is it your impression now that when a C–46 takes off from an airport fully loaded, having the maximum load it is certificated to carry, that the moment it gets off the ground it is able to fly on one engine under the present rules?

In other words, if a plane takes off with a maximum load, the moment it gets off the ground, if one engine goes out, is it your thought that it still will function with that one engine under the present rules?

Mr. HORNE. No, sir; you cannot say just as it gets off the ground. It has to get a certain amount of altitude and a certain amount of flying speed before it will come to that point. However, I point out that I am not an aeronautical engineer, and so perhaps we should refer that question to my aeronautical engineers who are here and let them answer it more fully than I can.

Mr. BECKWORTH. Being interested in safety, as you are, and thinking in line with Mr. Hinshaw's questioning as to those on the ground, particularly in the crowded areas like we have been discussing and seeing in recent times, do you feel that for the safety of those people down there on the ground that plane ought to be able to fly on one engine the moment it gets off the ground?

Mr. HORNE. I think it certainly should be able to continue flight on one engine as soon as it has passed a certain critical point after becoming airborne. Let me try to put it a different way. As soon as the airplane has reached a sufficient altitude and a sufficient distance along its path, the aircraft might become, as a previous speaker mentioned, a hazard or a missile of some kind, then the airplane should be able to fly on one engine and maintain its flight. I am speaking of a very nebulous period within a few seconds after the airplane leaves the ground, where it is still gaining flying speed, and then if it lost it, it would simply come back down on the runway and might crack up, but it would not hurt the people on the ground.

Mr. BECKWORTH. I am no engineer either, but it occurs to me that with the many types of activities near airports, it would not have to be just dwelling houses as we have, that if you got a plane the moment it leaves the ground that cannot possibly be sustained in the air if

one engine goes out, you may have a rather deadly instrumentality, because it certainly becomes a vehicle of devastation the moment that engine goes out if it cannot fly with just one engine.

Now, that is not true if you are flying immediately over water and there is no boat there, but it certainly is true, for example, if it were flying over hangars in an airport area or any kind of business establishment.

Let me mention this: Have other planes, such as DC–3's—as that plane leaves the airfield and just barely gets off the ground, is it presumed generally that it will fly on one engine if one should go dead right then, the moment it has left the ground, or do you know?

Mr. HORNE. I would like the aeronautical engineers to answer that question, because while I say unhesitatingly that once the DC–3, for example, is in the air, then it flies on one engine, but there is this very difficult nebulous period just at the point that the airplane is becoming airborne, and that is the most difficult period.

Now, just what performance which airplanes will do during that moment, you see, which only lasts for a matter of a few feet in altitude and a few hundred feet on the runway, I am not enough of an aeronautical engineer to be able to answer in detail.

Mr. BECKWORTH. May I ask this question: Is there any figure, even of an approximate nature, that distinguishes between what might be termed fair safety and no safety as a plane is leaving the ground? In other words, if it is 10 feet off and it has to come down on an airport, is there any figure that you can say that that is safe, or is there any data that would determine whether or not that is safe, whereas if it got 5 or 10 feet higher it would not be?

The thing that somewhat confuses me is, naturally, if a plane is a foot off the ground and it has got some more runway off there, it is reasonable to assume that there would be a chance for it to survive the coming down. Now, if it is 20 or 25 feet, which may embrace that nebulous period that you are speaking about, it is assumed that it could come back to the extremity of the airport's runway safely. Do you have any comments to make on that?

Mr. HORNE. I think your point is, which I agree with, once the airplane has reached a certain altitude, we will say 50 or 100 feet, and has reached a certain flying speed, then it is in a much safer condition. Now, it is in that condition before it ever comes over anybody's house, or something of that nature, in a general way, because each of the runways in the large commercial airports has a certain amount of overrun to it and a certain amount of clear space in the first few hundred or few thousand feet.

Now, different ones have different amounts, but in a general way the airplane is relatively safe as far as the airplane coming back on the ground again once it has reached an altitude of, we will say, 100 feet and it has developed its flying speed so that its gear is up and it has a sustained forward motion. Under those circumstances, the average airplane will fly satisfactorily on one engine.

Mr. HINSHAW. I presume that your engineering department can give us the total length of open space, including runway, that is required to maintain safety while the airplane is reaching that altitude and flying speed, for the several aircraft; is that true?

Mr. HORNE. I think they can give you whatever engineering data you wish with regard to the flying speed and altitude at which the air-

plane will maintain itself or which it will not. In other words, the flight characteristics are well known, and we can give you any information you desire, I think, on the flight characteristics.

Mr. BECKWORTH. And, Mr. Horne, if you could relate that data, we will say, to the Newark Airport, or the Idlewild Airport and the LaGuardia Airport, in view of the interest that has been manifested here recently, it might be helpful. Or you can do that for Washington National Airport.

We are particularly interested in those, because those are the areas where we have had a lot of discussion very recently.

Mr. KLEIN. Mr. Horne, you know, of course, all of the agitation that has been taking place, particularly in my own city of New York and Elizabeth and places around the Newark Airport, with regard to the closeness or the proximity of the airports to large cities. I know, of course, that your agency has no jurisdiction over the location of the airport, has it?

Mr. HORNE. No, sir.

Mr. KLEIN. But in answer to a question of Mr. Hinshaw's, I believe you said that your regulations do provide how long runways should be, in order to determine whether certain aircraft can land or take off in those airports. Isn't that so?

Mr. HORNE. That is correct.

Mr. KLEIN. Do you not think then that the factor of the location of the airport becomes important even to the CAA, because you may have a safety factor there, if the runway, let us say, is long enough; and yet we have had these three accidents in Elizabeth, which is almost next to the Newark Airport, and the possibility does exist that if anything happens to that plane in the take-off, that it may not be able to avoid crashing in that city or community or any other place which is densely populated adjacent to the airport. Don't you think that your organization ought to have some jurisdiction or some say on that, because of the safety factor?

Mr. HORNE. I think we have to recognize that the three accidents that you mention did not occur at the end of the runway or even within quite a little distance of it. They were all several miles away, after the airplane had been either fully airborne and was flying safely or when it was approaching the runway.

Mr. KLEIN. When you say several miles, you will admit that that is probably 1 minute or less of flying time, is not that so?

Mr. HORNE. Yes; depending obviously upon the speed of the airplane, and different airplanes fly anywhere from 100 to 300 miles per hour; but their landing and taking off speeds, of course, are normally in the neighborhood of 100 to 150 miles per hour

I think we must not fail to distinguish between the flying characteristics of the airplane and the distances required as the airplane becomes airborne when we are talking about the immediate vicinity of the airport, or when we are talking about the distance from the airport which Elizabeth or the city of Newark or any houses are, because by the time you get far enough away from the airport that you are over the houses and in the vicinity where these crashes occurred, you have long since passed any question of this immediate take-off performance.

Mr. KLEIN. Let me see if that is so. Let us review at least two of those accidents that crashed, in Elizabeth. One of them, the C–46,

I believe the accident took place around Christmastime, and it was taking off to go to Florida. It was observed that smoke was coming out of one of the wheels, the right wheel. Prior to the take-off, and certainly at the time of the take-off, and yet there was not sufficient time for that pilot to come back without crashing. And in the second one, within 1 minute's time after his actual take-off, he was noted to have told the control tower that one motor was out, and that is such a short time.

I admit that, of course, if you walked from the Newark Airport to Elizabeth, it might be some distance away, but actually it is right next to it when you consider that right after the take-off, within seconds after the take-off, they are over Elizabeth, in that particular case, and certainly in New York City after they take off from LaGuardia.

Now, my only question to you, and I appreciate at the present time you have no jurisdiction over it, but don't you think you ought to have some jurisdiction, and don't you think that that is a vital point in connection with the safety of the take-off and the landings of planes today?

Mr. HORNE. No, sir; I don't think we have made quite a clear case for it, for this reason: I tried to emphasize again that the critical time is during take-off, and in the immediate seconds of take-off. Now, the times that you are talking about are after the airplane is fully airborne. None of the accidents were caused by the airplane's failing to fly on one engine or on three engines; and they were all caused—I don't know for sure what some of the additional causes were because the investigations have not been completed yet, but there were additional factors in all cases as far as I am aware, in which the question that we were discussing here as to whether the airplane will or will not fly on one engine, was not pertinent. That is my point, and I do not want to overlook that factor, because the airplanes, once they are airborne and once they are in flying condition, will fly on one engine and have proved it, and will continue to prove it.

Mr. KLEIN. Now, let me go a step further. Now, let us take LaGuardia Airport, which is practically in a densely populated area. Supposing a plane was taking off at LaGuardia Airport and after it got to 1 foot or 10 feet or less and the pilot found that one engine was not operating. This is hypothetical, of course, but what could he do at that particular point in order to save any possible damage after he got up in the air? Could he stop that plane at that particular point?

Mr. HORNE. Well, again, I do not think that that can be answered in a yes-or-no answer. If the airplane has arrived at the point where it will fly safely, then the pilot can keep the plane flying and go around and come back again. However, if it is in that critical point where there is some doubt, then the airplane simply fails to fly and it comes down on the runway.

Mr. KLEIN. What happens? That is what I want to know. Let us take the second case that you have mentioned. Is it your opinion that it could stop on the runway itself?

Mr. HORNE. Oh, yes. In that case the airplane would simply come down on the runway, or perhaps a few feet off the end of the runway, and would stop. Now, the airplane itself might become damaged,

but it would not be any hazard to the people on the ground out in the city. There is no hazard to the people out there.

Mr. KLEIN. Does it not depend on the length of the runway?

Mr. HORNE. But that is one of the reasons that we have our regulations which require a certain length of runway.

Mr. KLEIN. I have a distinct recollection of an accident happening at LaGuardia when the plane did, I believe, just that, and it went over a fence and landed in the aeronautical school, which is right across the road from the LaGuardia Airport. It jumped the highway, and there are homes there; and I just came down this morning, and you know that there were homes in the immediate vicinity of the LaGuardia Airport, so that even taking your case, there is a great likelihood or a possibility, let us say, of the airplane's doing some damage to some of these houses on the ground.

Mr. HORNE. It seems extremely unlikely to me, and I think the records indicate that it is such an unusual and most unlikely situation that it is hard put to it to find any cases.

Mr. KLEIN. I think you will agree that it was unlikely for three accidents to happen in the same particular area in a short period of time, that is probably a 100,000 to 1 shot.

Mr. HORNE. I certainly will agree with you.

Mr. KLEIN. And I think it is our job to see if we cannot prevent the extremely unlikely happenings.

Mr. HINSHAW. Now, is it a fact that each type of aircraft has a regulation applicable to it which will limit its use of runway on take-off under certain wind conditions? For example, take the short runway at LaGuardia which is, I believe, the one on the west side of the field; it is a rather short runway, and I think it is 3,000 feet long or some such figure as that. Could a C–46 carrying 48,000 pounds under still wind conditions be allowed to use that runway on take-off?

Mr. HORNE. I would have to refer that question to our technical experts, sir.

Mr. HINSHAW. There is a limitation of length of runway which would prevent them from using that runway under those circumstances, if it is too short, is that correct?

Mr. HORNE. Oh, yes.

Mr. HINSHAW. What sort of a regulation is that, and how does it apply? And perhaps you would like to have one of your technical people discuss it.

Mr. HORNE. Yes; I will be glad to.

In a general way, the airplane is certificated for take-offs and landings with a certain length of runway, depending upon weather conditions and load conditions and so forth, and it would be a violation of the regulations if the pilot attempted to land on a runway which was too short or attempted to take off from a runway which was too short. That would be a violation of the regulations.

Mr. HINSHAW. By that, do I understand, let us say these itinerant aircraft coming under part 3 of the regulations, which may land at any airport in the United States, depending upon their destination and en route stops required for refueling or weather and so forth, those pilots would have to refer then to the map of the airport giving the runway length and compare that with the wind conditions, including direction and velocity, before they could determine whether or not they would be permitted to land on that runway?

Mr. HORNE. In a general way that is correct, sir; it is the pilot's responsibility that he will not land at a place which is not safe, considering the type of aircraft and the length of runways and the wind conditions.

Mr. HINSHAW. Well, has it been your observation that they comply with that regulation, if you want to call it that, in the sense that when they do find that that is the runway being used, that they will avoid the use of that runway if they are going to be in violation in using it?

Mr. HORNE. It has been our observation that pilots are extremely careful and cautious about not taking off with runways that they should not take off on, depending upon the wind and load conditions, and similarly for landing.

Mr. HINSHAW. Of course, that is based upon their certification, is it not?

Mr. HORNE. Well, there is the certification of the aircraft.

Mr. HINSHAW. That is correct, and that certification of the aircraft relates directly to the length of runway which that aircraft will require under certain conditions; is that correct?

Mr. HORNE. That is the general idea; it is a little more involved than that, but that is the general idea.

Mr. HINSHAW. How involved is it?

Mr. HORNE. I would like to have one of our people who make a specialty of that kind of thing explain in more detail.

Mr. BECKWORTH. That is satisfactory. Is he here right now?

Mr. HORNE. This is Mr. Omer Welling, of our Office of Aviation Safety, and I think perhaps he can do a more exact job than I can on answering that technical question.

Mr. BECKWORTH. State your full name, please.

STATEMENT OF OMER WELLING, DEPUTY CHIEF OF AIRCRAFT DIVISION, CIVIL AERONAUTICS ADMINISTRATION

Mr. WELLING. Omer Welling, Deputy Chief of Aircraft Division, CAA.

Mr. Congressman, as I understand your question, you are asking whether or not the regulations involving the types of certification of the airplane specify a minimum length of runway upon which it may land. Is that correct?

Mr. HINSHAW. Or whether there is any relation between the types of certification and the minimum length of runway which may be employed for landing or take-off, at certain altitudes, under certain conditions.

Mr. WELLING. The regulations governing airplanes certified in the transport category lay down operating rules which specify that the weight at which the airplane is dispatched may not exceed a value such that when it arrives at a destination, the landing distance which has been measured as a part of the type certification exceeds a specified percentage of the available length of runway, at the destination.

Mr. HINSHAW. What about take-off?

Mr. WELLING. It also specifies that the airplane shall not be dispatched at a weight in excess of one such that in the event an engine fails during the take-off it can either stop within the length of the runway or continue with that engine inoperative.

Mr. HINSHAW. Then that would definitely limit the runway length at a given altitude, would it not?

Mr. WELLING. It specifies, in effect, a minimum runway.

Mr. HINSHAW. A minimum limit; yes.

Mr. WELLING. Yes.

Mr. HINSHAW. Is that figure available to the pilots of the aircraft, and do they all know it?

Mr. WELLING. The regulations governing the type certification of an airplane in the transport category require the determination of those distances and require that an airplane flight manual be supplied, a copy with each airplane, which contains information of that kind; yes, sir.

Mr. HINSHAW. I am glad it is aboard the airplane, but does the pilot know it, and is he required to know it?

Mr. WELLING. Well, sir, it is required to be carried in the airplane.

Mr. HINSHAW. That is lovely, but if the pilot does not happen to know it, why he can take off from anywhere without regard to it, can he not?

Mr. WELLING. It is my understanding that it is his responsibility under the law not to exceed any of those limitations; that is, the act says that it is a violation of the law to operate an airplane outside any of the limitations which have been established as a part of the type certification.

Mr. HINSHAW. Do you happen to know whether pilots have been cited for violations of such a regulation?

Mr. WELLING. I have no personal knowledge of that, sir.

Mr. HINSHAW. Let us get down to part 3, because part 3 is quite a bit different apparently from part 4. Is there any such requirement on part 3?

Mr. WELLING. There is no requirement in part 3 that information of the kind described for transport category be determined. There are, however, operating rules applicable to irregular air carrier operators which also specify certain minimum lengths of field, or runways I should say.

Mr. HINSHAW. Does that apply to a type of aircraft or merely for their personal operation regardless of what they are flying?

Mr. WELLING. It is a part of the rules governing the issuance of an air carrier operating certificate.

Mr. HINSHAW. But it is not related to the type of aircraft flown?

Mr. WELLING. In the sense that the performance of the particular airplane which is flown must be related to the dimensions of the field, to the length of the runway.

Mr. HINSHAW. Well, now, as I understand it, the C–46 was certificated under part III in 1945, and at that time practically its sole requirement was that it would be able to pass through 5,000 feet on a single engine climb after being airborne, and now what other requirements may have been called for the committee is not aware, as that was the only one that certainly I remember having been given to us on last Friday when we temporarily suspended these hearings.

Is there any other requirement of the C–46 as it was certificated under part III than that?

Mr. WELLING. For the purposes of the issuance of a type certificate to the airplane, that is the only performance requirement that it was required to meet with an engine inoperative.

Mr. HINSHAW. It is difficult for me to see how without further tests and specifications resulting therefrom, you could set a runway minimum limitation under those conditions.

Mr. WELLING. Well, let me try to explain it in this way. This is a complicated situation, sir. There is a part of the regulations, the Civil Air Regulations, which lay down requirements for the issuance of an air carrier operating certificate. There is such a part governing the issuance of such certificates to irregular air carrier operators, and I believe that Mr. Chamberlain in his testimony last Thursday identified that as part 42 of the regulations.

Mr. HINSHAW. That came into effect rather recently, and this other regulation was in effect in 1945.

Mr. WELLING. That is correct. That part 42 and in particular these provisions which I mention which do relate to performance of the airplane, to the length of the field, have become effective comparatively recently but they have been made applicable to the C–46 airplane used by irregular air carrier operators.

Mr. HINSHAW. Now, just recently or, let us say, last summer you completed certain tests of the C–46 aircraft, tests which may have been made before and probably had been made before but which were then made because there was some doubt as to the ability of the C–46 to meet certain performance characteristics that seemed to be desirable. As we understand it, you are about to come into a hearing before the CAB in connection with certain rules and regulations that ultimately may be promulgated by the CAB. Now, if these statistics were available long ago, and not just last summer, could you tell the committee when they were available? These facts and figures were as to the ability to climb and take off with load, and so forth, and so on, whatever they were, that you made your tests for last summer.

Mr. WELLING. Well, I believe, sir, that the answer to that question is that we have known what the performance of the airplane was since it was originally type certificated back in 1945.

Mr. HINSHAW. That is where the confusion arises in my mind, Mr. Chairman. That is as to how it could have been type certificated for a gross load of 48,000 pounds without any reference, for example, to length of runway which would be required both at sea level and altitudes and under certain atmospheric conditions as it applied to transport categories. After all is said and done, the airplane is carrying passengers as well as cargo and it is flying in and out of airports in congested areas, and certainly ought to have qualifications which will permit it to operate as safely as would any other airplane carrying passengers or cargo, should it not?

Mr. WELLING. I believe it should, yes, sir; but let me speak to that points. The law provides for the issuance of type certificates. It also provides for the regulation of operation of airplanes in air carrier operation, but not all airplanes which receive type certificates operate in air carrier operations.

Mr. HINSHAW. Perhaps we should have for our benefit a better definition of the term "air carrier operation" because while the act came out of this committee and it was subject to amendments, we have had a great many other bills that are considered by the committee and we are probably not as familiar with the right definition of that term as we should be. May I suggest that we receive a definition of this term "air carrier operations," which has been referred to both

by yourself and Mr. Horne so that we are fully cognizant of what that term includes. Perhaps the attorney for the CAA would like to answer that question.

Mr. BOYLE. My name is Robert P. Boyle, Deputy General Counsel of the Civil Aeronautics Administration. The statute defines an air carrier as any citizen of the United States who undertakes whether directly or indirectly or by lease or any other arrangement to engage in air transportation. Air transportation in its turn is defined in the statute as the carriage by aircraft of persons or property as a common carrier for compensation or hire or the carriage of mail by aircraft. In other words, the definition of an air carrier is any person who holds himself out as a common carrier to engage in the transportation of persons by aircraft for hire.

Mr. HINSHAW. It does not include contract operations, does it?

Mr. BOYLE. No, sir; it does not include contract operations as such.

Mr. HINSHAW. We never did write the contract section of the Civil Aeronautics Act, have we?

Mr. BOYLE. No, sir; there have been several bills introduced, I believe at one point this committee did consider a revision of the Civil Aeronautics Act which was proposed, I have forgotten exactly who proposed it, but it did provide for a special part regulating both the economic and safety factors of contract carriage by air.

Mr. HINSHAW. Now at the present time under the common-carrier provisions, as I understand it, you have two classes at least, one is the common carrier of passengers for hire and the other is the common carrier of cargo for hire, and both of them are certificated for those puposes, is that correct?

Mr. BOYLE. That is right.

Mr. HINSHAW. Or a combination of those, I suppose would be included.

Mr. BOYLE. That is right.

Mr. HINSHAW. Now, does an irregular carrier which holds itself out to take passengers between one point and another come under the definition of a common carrier?

Mr. BOYLE. Yes, sir. The irregular air carriers are a classification of air carriers established by the Civil Aeronautics Board.

Mr. HINSHAW. And do I understand that if a particular agency selling tickets for transportation from one part of the United States to another holds itself out for that purpose, and then contracts with another carrier, or contracts with a carrier, somebody operating an airplane to transport these people, that the person owning the aircraft becomes a common carrier?

Mr. BOYLE. Not exactly. It does not work exactly in the manner you have stated. My present impression of the way the ticket agencies so-called are operating is this: They will accumulate loads of passengers for the nonscheduled air carriers, and the nonscheduled air carriers being a large group of individuals, all of whom are each individually certificated as common carriers, and having accumulated a load of passengers the ticket agency will contact one of those common carriers and ask that common carrier to accept this load of passengers to go from A to B.

Mr. HINSHAW. So that the owner of the aircraft, whatever it may be, an individual, an association, or corporation, is a common carrier in all cases.

Mr. BOYLE. It is our opinion that he is, sir; yes, sir.

Mr. HINSHAW. Is that conceded by the owners of the aircraft, the contractors and the ticket agency?

Mr. BOYLE. In my opinion, it is. I say that because we handle a large number of enforcement cases against the irregular carriers and we have not in recent years been met with the defense that you have just suggested.

Mr. HINSHAW. Then the term to which we were referring a moment ago, the exact wording of which has now escaped me, I think it was "air-carrier operations," that term applies to all of these irregular carriers, whether or not they have contracted to transport a given number of passengers with a ticket agency.

Mr. BOYLE. Let me put it this way, I believe it would cover the great majority of their operations. It is my personal opinion that it is a very difficult thing for a corporation who is a common carrier to escape their responsibility as a common carrier through an individual contract. It can be done as a matter of law, but I think it is exceedingly difficult because he is obtaining that business by virtue of the fact that he is a common carrier.

Mr. HINSHAW. Now, let us go back to your definition of a common carrier at the commencement of this discussion, because if these carriers are common carriers then they come directly under the law; do they not?

Mr. BOYLE. Yes, sir.

Mr. HINSHAW. And the aircraft used and all of the regulations applicable thereto are supposed to be identical with the regulations of other common carriers; are they not?

Mr. BOYLE. They are identical within their classifications; yes, sir.

Mr. HINSHAW. Within their classifications?

Mr. BOYLE. I am merely distinguishing between an irregular air carrier and a regular carrier or scheduled carrier.

M. HINSHAW. Is there any reason why a different set of regulations in respect to airworthiness should apply to one carrier more than another?

Mr. BOYLE. It is the position of the CAA that they should not.

Mr. HINSHAW. Who differs with the CAA on that?

Mr. BOYLE. In the recent proceeding before the Civil Aeronautics Board, we had quite a bit of opposition from the representatives of the irregular air carriers.

Mr. HINSHAW. Why did they think they should not come under the same regulations as common carriers? Of course, I perhaps should not ask you that question except that you may answer it as hearsay, because of course you cannot speak for them.

Mr. BOYLE. The position was not defined as such. The issues before that proceeding were specific, and they were with respect to the C–46 aircraft. It is only a generalization from their position that I reach the conclusion that there were some people in opposition to our general position.

Mr. HINSHAW. Now, if we can get back to the gentleman who just left the stand. In view of the fact, sir, that these irregular carriers come under the definition of common carrier as stated by your deputy general counsel, do you see any reason why these common carriers should not be required to live up to the same safety regulations as the certificated air carriers in scheduled operation?

Mr. WELLING. From the point of view of safety, I personally can see no reason. There is argument that it is an unfair economic burden to place upon them.

Mr. HINSHAW. That I presume is debatable on the other side. The economic reasons in my mind should never outweigh the safety provisions, but that is only my personal viewpoint of the matter, and I am perfectly willing to listen to anyone who wants to testify to the contrary. But you say that that is the contention.

Mr. WELLING. Yes, sir.

Mr. HINSHAW. Has any action been taken by your Division, and of course you are not the head of it, I believe that Mr. Hensley is the head of it, to advocate that common carriers of all classes should be required in their vehicles and in their operations to live up to the same standard of safety as is required of the certificated carriers?

Mr. WELLING. I believe, sir, as Mr. Horne has already stated, that the Civil Aeronautics Administration has formally recommended to the Board that it take appropriate action to bring that about.

Mr. HINSHAW. Am I correct in assuming that the reasons for the action are apparently those of safety to passengers and cargo and people on the ground?

Mr. WELLING. The reasons for our recommendations, you mean, sir?

Mr. HINSHAW. Yes.

Mr. WELLING. Yes, sir.

Mr. HINSHAW. I am always interested in whether or not the safety of the people on the ground has been considered in this connection, because so frequently when we refer to passengers and think of the safety of the passengers first and foremost, when actually the numbers of people that may be in the path of an aircraft are larger in number than the passengers on the aircraft.

Mr. WELLING. Well, perhaps it has not been made clear to you, sir, that the transport category requirements do provide reasonable assurance that the airplane will be able to continue flight in the event of the loss of an engine during take-off if it has passed a point beyond which it cannot stop within the length of the field.

Mr. HINSHAW. Is there any requirement or any provision made for anyone to officially clear or refuse clearance to an aircraft on take-off providing the runway length is not long enough to meet the standards which have been referred to for runway length minimum?

Mr. WELLING. Well, the situation with regard to that is this: The minimum length of runway required for take-off at a given altitude of an airport at a given weight of a particular airplane is a part of the limitations of the airworthiness certificate of the airplane. The law says it is a violation for any person to operate an airplane outside of limitations which have been imposed upon the certificate. Now, as Mr. Hensley explained, I believe, Friday during his testimony, that responsibility rests upon the operator of the airplane. We do not have sufficient people to check individually each flight to see whether or not it is in compliance.

We have, however, reviewed a presentation by the carrier of the limiting weight for a given runway on a given airport or a given airplane and have found that it does comply. We have probably also reviewed his operating procedures to insure that the people who are responsible are properly informed concerning what those limitations are. We then, as Mr. Hensley has explained, make spot checks such

as we can. In the event we find violation, we may or may not file a violation, depending upon whether or not we believe that the thing was willful, let us say.

Mr. HINSHAW. Am I correct in my information that the number of personnel of the Safety Bureau of the Civil Aeronautics Administration has been materially reduced in the last 4 years?

Mr. WELLING. There have been reductions each appropriation year for 3 years and Mr. Hensley can perhaps furnish more exact information on that question, sir.

Mr. HINSHAW. If my memory serves me correctly, some years ago you had 2,100 personnel all over the United States, and the rest of the world, where the Civil Aeronautics Administration operates, and I think that that number has been reduced to about 1,400; am I correct, Mr. Hensley?

Mr. HENSLEY. No, sir; it is 1,716 authorized at the moment.

Mr. HINSHAW. How many did you have at the maximum?

Mr. HENSLEY. There was a maximum of 2,035.

Mr. HINSHAW. What is your present staff?

Mr. HENSLEY. May I correct the figures I just gave you. It is 1,756 as authorized for fiscal year 1952, and 1,716 is the present number of authorized positions.

(NOTE.—The total number of positions filled is 1,621 at present time.—E. S. H.)

Mr. WOLVERTON. May I inquire at that point, is there any particular department or division that suffered by a specific reference in the appropriation bill, or was it left to the judgment of the head to determine where the reduction should take place?

Mr. HENSLEY. It is my understanding, sir, that the appropriations are made through the department, and the bureau or agency to the program area, it being the prerogative of the responsible person to make that adjustment within his field.

Mr. WOLVERTON. Has your agency requested additional funds for inspection purposes; that is, inspection from the point of ascertaining whether regulations are complied with?

Mr. HENSLEY. Yes, sir; that has been done.

Mr. WOLVERTON. How many have you applied for that have not been granted?

Mr. HENSLEY. I can give you first-hand figures only of the last request. As I recall, additional technical personnel requested that were denied, I believe, were only six; that is, six additional technical personnel for the establishment of two additional offices. Now, the others I can submit for the record; I do not recall them at the moment.

Mr. WOLVERTON. In view of the fact that frequently the statement has been made that you do not have sufficient number of persons to make inspections that at times have appeared to some member or members of the committee might properly be made, it seems to me that your request for six additional ones is a very meager request, and does not, in my opinion, reflect the importance of proper inspection. I am inclined to think, and I do not want to prejudge anybody or any agency or anything, but I am inclined to think that the question of the inspection as to whether regulations and rules are carried out is of much more importance than it apparently seems to be at the present time.

In other words, if it is necessary to make rules and regulations, that deal vitally with the safety of passengers as well as those who are in surrounding areas to airports, that then it becomes of primary importance to ascertain whether those rules and regulations are carried out, and that it cannot be left entirely, as it seems to be, at the present time, to the action of the airline.

Some are of the opinion that it would take more to carry out some of the inspections that some of us have had in mind than would be feasible. I do not know about that. I only know this: That when you fix those rules and regulations, you do it because you consider it important to do so from the standpoint of safety, whether above or on the ground, and I am inclined to think that there is not enough supervision of the question of inspection as there should be.

Mr. HENSLEY. May I acquaint the gentleman with one other item that you may be overlooking. We have in addition to the regular agents as we call our technical personnel that maintain the supervision of the operations, other representatives of the Administrator called designees who participate in inspection also. Now, of that number we have 3,000 such persons, who function under the direct supervision, in the nature of assistants, if you like, of our own agents. Now, that is in addition to the routine and regular inspections that are made by the carriers or the operators of the aircraft.

Mr. WOLVERTON. I am speaking more specifically than general inspection. For instance, in the list of accidents that was presented to us in our last hearing, in going over them quickly, I observed that about half of them in the report of the accident contained the phrase "failure to gain altitude."

Now, I think we are all agreed that the ability to attain altitude is a very important feature and it is the basis of the take-off load that you fix, and it is the basis of the length of the runway, and so forth. Now, the type of gasoline that is used is very important to the question of gaining altitude, and the higher the octane the better degree of altitude can be obtained.

Now, these planes take off, and it has been revealed to us in some instances where they were certificated to use 100-octane gasoline, it was found that they had used 90 or 91. Of course, I am not in a position to have the technical information that would determine to what degree that reduces the safety feature. In view of the fact that so many of the acidents were shown to us the other day in the list contained a reference to the fact that there was inability to gain altitude, it seemed to me that the type of gasoline that is used should be a matter of inspection.

Now, I do not know whether in these take-offs at the Newark Airport, whether the question of the type of gasoline will enter into those reports or not. In several hearings that we have held we have heard much about engines, and about propellers, and so forth, and as yet I have not heard anything said with respect to the type of gasoline that was used. And yet, in two of those instances at the Newark Airport, there was evidently a failure to gain altitude. In one instance it was observable in the control tower, and it prompted the control officer to immediately talk to the pilot of the plane and ask if everything was all right, and he was told that one of his engines had dropped out, or words to that effect. In the other instance it was observable that sparks were flying before it got off the ground. That

may indicate that the type of gasoline had nothing to do with it, but I am hopeful that in whatever investigation is made, I want to attest to the efficiency of Mr. Fluett in the investigations he is making, and I would like to hear something about who knows what type of gasoline was in those planes.

I am of the opinion that in view of that inability to gain altitude that was referred to in so many of those reports of accidents that was presented to us, it is important for some inspection to be made other than a mere certificate from a company that supplies the gasoline to determine whether it is of the octane that that particular engine from the standpoint of the manufacturer as well as from the standpoint of your agency has required it to have or to use when you granted the certification.

Mr. HENSLEY. Sir, I made inquiry into the question of the Elizabeth incident in the case of National Airlines, and we have not yet a report of the octane rating of the gasoline actually in the tanks both in the aircraft and in the refueling truck. I was in hopes that I could give you a report of the samples that were taken from both places, and which are presently in the laboratory being tested. I checked with Mr. Fluett following your inquiry the other day, and they have not yet received the reports from the laboratories to determine exactly what the rating of that gasoline was. So that is being done.

Mr. WOLVERTON. May I ask you or someone of your technical staff people how difficult it is, if it is difficult, to ascertain the type of gasoline that is in a plane about to take off without regard to what may have been reported by the company that supplies the gasoline. I have in mind that when you want to make a test of whether you have got enough antifreeze in your radiator all you have to do is pull a thermometer of some kind and place it in the water, and I thought maybe it would be just as simple to ascertain the degree of octane. Is that so or not?

Mr. HENSLEY. If I may, I have Mr. Briggs with us, our power-plant engineer, and I would like for him to answer your question.

Mr. WOLVERTON. I would like to have it answered if the committee does not feel that I am pressing something that is not important.

STATEMENT OF ELMER BRIGGS, ENGINE SPECIALIST, POWER PLANT BRANCH, CIVIL AERONAUTICS ADMINISTRATION

Mr. BRIGGS. My name is Elmer Briggs, engine specialist, Power Plant Branch, Civil Aeronautics Administration. To answer your question, basically the fuels are identified by their color to which the basic fuels have been added, and a dye is added to attain a certain color, to identify that fuel in a general sort of a way.

Mr. WOLVERTON. Does the process of preparing that gasoline give it a different color, or is it given a different color by the manufacturer to identify it as to its octane rating?

Mr. BRIGGS. The difficulty is that the basic gasoline is colorless, and the dye which is added is necessary to color it, and otherwise it is colorless.

Mr. WOLVERTON. So that if a wrong coloring is added, and if a 100-octane color is put into a 90-octane gas, it would then have the appearance of 100-octane; is that right?

Mr. BRIGGS. That is correct.

Mr. WOLVERTON. Is there any means of determining, regardless of color, what is the octane?

Mr. BRIGGS. Not without a very involved laboratory test of the gasoline.

Mr. WOLVERTON. You would have to take the gasoline in each particular flight and put it through a laboratory test to determine the octane of that gasoline?

Mr. BRIGGS. Yes, sir.

Mr. WOLVERTON. There is no simplified method of ascertaining it?

Mr. BRIGGS. No, sir.

Mr. BECKWORTH. Will the gentleman yield for a question there? Is that also true where, for example, State agencies test the grades of gasoline in pumps that give out gasoline to the public? Do they have to carry those tests to the laboratory?

Mr. BRIGGS. Yes, sir; in order to determine the octane equivalent for that gasoline it would have to be done in a laboratory.

Mr. BECKWORTH. In order to determine the octane content, is that right?

Mr. BRIGGS. That is the manner in which fuels are graded.

Mr. BECKWORTH. In most States they do check up on the grades of gasoline at filling stations, do they not?

Mr. BRIGGS. Yes, sir, and might I explain that in automotive gasoline the control of octane is not anywhere near the same quality, you might say, in that we have essentially two grades of automotive fuel, premium and regular. The octane fluctuates considerably and there is no requirement to say otherwise. But when it comes to aircraft fuel, its octane equivalent is one of the very prime essentials in connection with its use. Therefore, the octane requirement there is rigidly specified and because of the color added you can see there it is an attempt to identify the fuel properly.

Mr. BECKWORTH. Is there any unusual injury that can come to an engine that does not use the proper octane content of gasoline?

Mr. BRIGGS. I am afraid I missed one word of your question there.

Mr. BECKWORTH. Assume that a given engine should have a given octane content of gasoline, and instead of using the high octane content which it should have for the best functioning, it uses a cheaper lower-octane content. Do you know whether that usage of the lower-octane content of fuel would injure the engine of the airplane, generally speaking, more than the other?

Mr. BRIGGS. It could injure the engine, but you cannot say definitely that it would in every case.

Mr. BECKWORTH. One of the reasons why a person undertakes to use good gasoline in his automobile is to protect his engine.

Mr. BRIGGS. That is right.

Mr. BECKWORTH. I am wondering if the same reason would apply to the operator of an airplane, or is there a difference?

Mr. BRIGGS. There is very little difference in that respect. That is the purpose of using the specified quality of fuel, to prevent damage to the engine.

Mr. BECKWORTH. Does low-octane gasoline tend to cause the engine to need reworking after fewer hours?

Mr. BRIGGS. Yes, sir, and it may also cause distress in the engine which would incapacitate that engine.

Mr. BECKWORTH. The same as you get knocks in your automobile, is that right?

Mr. BRIGGS. That is right.

Mr. BECKWORTH. I take it from what questions have developed, the fact that you cannot test this gasoline without a laboratory procedure, probably the only motivating cause for people to use the good gasoline is to protect their automobile and you do very little testing as a matter of fact, and probably very little testing is done.

Mr. BRIGGS. You are speaking of automotive fuels?

Mr. BECKWORTH. I am speaking of airplane fuels. Would you say that very little testing of gasoline is carried on either by the Government or by the operators of the planes? Do they have to rely on the companies that sell the gasoline?

Mr. BRIGGS. That is correct, yes, sir.

Mr. WOLVERTON. What, if any, inspection is made to determine whether you have got the right colored gasoline before a flight takes off?

Mr. BRIGGS. It is my understanding, sir, that the fuel suppliers are required by their customers to give periodic statements, signed statements as to quality of the fuel they are delivering on certain dates.

Mr. WOLVERTON. What color is required for 100-octane gasoline?

Mr. BRIGGS. Green, I believe it is.

Mr. WOLVERTON. All right. Now is any inspection made by anybody when that airplane takes off whether it has green gasoline or orange colored or red or any other color?

Mr. BRIGGS. I cannot answer that directly, but there is little opportunity for that, however, sir, in the manner in which gasoline is handled.

Mr. HENSLEY. There are at least two checks made on that, sir, one is the draining of the carburetor sump which is a requirement on the preflight inspection, which is made before each flight, and in addition the copilot, or if there is a flight engineer, he is required to be present at the fueling of the aircraft, and so there we have two inspections that the proper gasoline is being placed in the airplane.

Mr. WOLVERTON. Are either of those inspections carried on by a Government official?

Mr. HENSLEY. Not as a regular thing, but as a sampling inspection.

Mr. WOLVERTON. When you say sampling, what do you mean, it might be done today and it might be done again 2 weeks from now?

Mr. HENSLEY. Yes, sir; it could be that way, it is an unannounced inspection, that is what I mean by sampling.

Mr. WOLVERTON. What I am getting at is this, is there any kind of an inspection made by a Government official to determine whether it has 100-octane gas or a lesser degree of octane?

Mr. BRIGGS. Not before every flight. There is the sampling procedure.

Mr. WOLVERTON. Would that be a very difficult thing to do?

Mr. BRIGGS. It would not be at all difficult.

Mr. WOLVERTON. From your explanation, it would seem to me that it might be a very simple procedure if you had the inspector there to do it.

Mr. BRIGGS. That is correct, sir; and now to be clearly understood on this problem, it is a simple thing to do, I agree, but there is an aircraft taking off, I think, about once ever 7 seconds in this country, and it is a difficult thing to have a person present at each take-off to sample that. That is the magnitude of the job of having that many people at that place at that time.

Mr. WOLVERTON. I have noted that most of the planes are on the field quite a while before they take off.

Mr. BRIGGS. That is correct, but in addition we also have people there.

Mr. WOLVERTON. They do not come in and go out or start off in periods of 7 seconds, so far as their presence on that field is concerned.

Mr. HENSLEY. That is correct, and now our method of sampling may be in this manner: We might station an agent at a particular spot, and his chore or duty for that day would be an inspection of this kind on the operators that he could find. For that particular day that would catch the very thing that you are talking about on every operator or every flight of that particular day, but it is not done as a daily inspection procedure. That is for the reason that we do not have enough people to cover a take-off every 7 seconds.

Mr. WOLVERTON. How many inspectors do you have at the Newark Airport for one purpose or another?

Mr. HENSLEY. We did have five before the Newark Airport was closed.

Mr. WOLVERTON. I mean when the airport was in operation.

Mr. HENSLEY. We have since moved those to Idlewild and La-Guardia Fields.

Mr. WOLVERTON. How many did you have at Idlewild?

Mr. HENSLEY. At Idlewild I believe we had 11 technical people.

Mr. WOLVERTON. And how many at LaGuardia Field?

Mr. HENSLEY. There are 12 at LaGuardia.

Mr. WOLVERTON. And the presence of those inspectors in numbers such as you have indicated are not sufficient to see what kind of gasoline is in the plane before it takes off?

Mr. HENSLEY. I think we could do that. However, there are other inspections that I think are just as important as that, too.

Mr. WOLVERTON. Well, they may be more important for that matter, and I am not speaking of this in relative importance, and if this is important for a manufacturer to say this engine must have 100-octane gasoline, and when you read the certification you say this plane must operate with 100-octane gasoline, you do it because not only for the efficiency of the engine but you have in mind the whole use of that engine, when lives are at stake in the proper use of that engine, and it seems to me that you cannot discount the importance of knowing whether that particular grade of gasoline is used. That is just my view of it, and like Mr. Hinshaw, I hesitate to bind anybody else by my views, but that is very definitely my opinion.

Mr. HENSLEY. I did not mean to minimize the importance of checking the fuel that is placed in the airplane, I agree with that, but I meant to imply that here are many other things that need to be checked, too. Now, we do have one situation where I think the economics and the safety of the operation involved pull together. Usually they are pulling opposite each other. Here it is to the advantage of the operator to have the best grade of fuel that he can and see that he does

have the right grade of fuel in order to give a longer life or better operation to his engines, and so it is to his advantage to insure as well as the Government to insure that he gets the proper grade of fuel.

Mr. WOLVERTON. I do not want to take further time now to pursue this one thought, but I am very much interested in this whole subject of inspection, and at a proper time when I will not take too much time of the committee with the questions they wish to ask, I intend to ask some questions as to the duties of these inspectors, as to whether they do examine with respect to regulations and rules, and so forth, before a plane takes off, having regard to the regulations that have been fixed by your agency.

Mr. HENSLEY. I would be delighted to show those to you.

Mr. BECKWORTH. Why are you short 40 inspectors now, you just cannot recruit people?

Mr. HENSLEY. No, sir, included in the 1,756 authorized strength, there are clerical people, too. There are engineers involved, which is the most difficult area in recruitment because of the demand on the outside, and since competition there is much more attractive than we can offer engineers, as you have noticed by the advertisements in any of the trade journals. Clerical help is just a little tight, but I think our vacancies are actually more in the engineering area rather than the agent vacancies which I believe are at seven at the moment.

Mr. BECKWORTH. Even though you asked for six, do I understand you asked for six more?

Mr. HENSLEY. The most recent request; yes, sir.

Mr. BECKWORTH. But you are actually short how many like the six for which you asked, how many have you been short this far?

Mr. HENSLEY. Under our present authorization we are only actually short seven, meaning that we have seven vacancies.

Mr. BECKWORTH. You have 7 vacancies, and if you got the other 6 that means that you would be operating with 13 more than you presently have.

Mr. HENSLEY. May I say it this way: It becomes just a little involved, perhaps, but the effect of the most recent leave law was interpreted, as far as this particular program was concerned, to amount to about 42 positions. Now that did not mean that they were all agent positions, but the calculation was based on the number of additional days of work available because of the decrease in leave allowed, which would be equivalent to 42 positions. Those were the positions stricken from the program and that is what reduced our authorization to the present figure of 1,716.

Now, that procedure is undoubtedly quite proper, and in some cases it works and in some cases it does not. In the case of agents stationed at one spot where we have only two, it creates a problem.

Mr. BECKWORTH. We are talking about people who work for CAA, to help to bring about safety, and that is the topic of our discussion right now. If I understand correctly, you have asked for six more—is that right—engineers?

Mr. HENSLEY. I mentioned that that was the request.

Mr. BECKWORTH. I do not get that. Of course, you mentioned that you have 1,716 authorized, and that is for what, authorized for what division?

Mr. HENSLEY. That is for the aviation safety program of CAA.

Mr. BECKWORTH. Now, if I understand correctly, you have asked for six more engineers, which would be technical people for safety purposes; is that right?

Mr. HENSLEY. That is in the request as it went forward for fiscal year 1953, and perhaps I had better get it on that basis so that we will know what we are talking about.

Mr. WOLVERTON. To whom was that request addressed, to the Budget Bureau or to the Appropriations Committee?

Mr. HENSLEY. Through channels, it was addressed from me to my Administrator and from there to the Secretary of Commerce, and I believe at that point the six positions that I mentioned were deleted from the program as it went forward to the Budget Bureau. I believe I am correct in that.

Mr. WOLVERTON. Is it possible when the Budget Bureau has submitted its budget to the President for you to go before the Appropriations Committee and find fault with the budget and say that it should be more than that?

Mr. HENSLEY. It is quite possible. I take the position that I state my case and my needs and my requirements at each level and when the Budget Bureau submits the President's budget, that is my budget, and I do not propose to go beyond that.

Mr. WOLVERTON. How does Congress under those circumstances ever become aware of the needs of your Department, because if it were not for a man like Mr. Hinshaw has proven himself to be in the years that have characterized his service in the Congress, who has continuously made these fights on the floor of Congress, it is due in his case to his very great interest in this subject, but aside from that Congress does not have any realization whatsoever of what your claims are, or what your desires might be. We do not have presented to us your report to the Department of Commerce or the Department of Commerce report to the Bureau of the Budget. All we get is the budget, and by that time something has happened to it. It is done either wisely or unwisely and Congress is left more or less in the dark. We would be in complete darkness in many instances if it had not been for the interest of our friend, Mr. Hinshaw.

Mr. HENSLEY. Those efforts and that understanding is certainly very much appreciated. I do not feel it is my prerogative to take exception to the budget as it is presented by the President, and I feel that I have had my opportunity to be heard as far as my particular program requirements are concerned, and I certainly have respect for the decisions that are made along the line as to whether they can be afforded in the particular program or not. But I have had my chance to be heard as far as the safety program is concerned.

Mr. WOLVERTON. But not so far as the Congress is concerned.

Mr. BECKWORTH. Of the 1,756, how many are inspectors, the kind that would do such things as checking on gasoline or any other thing that would constitute a part of the safety inspection?

Mr. HENSLEY. We have 586 persons actually engaged in the type of activities that we are talking about in the field, at the airports, making the actual inspections.

Mr. WOLVERTON. And how many unfilled positions like the 586 are there?

Mr. HENSLEY. That is the seven that I mentioned, the seven field vacancies.

Mr. BECKWORTH. Then you have asked for 6 more, is that right, like the 586, and 7, or have you asked for any others?

Mr. HENSLEY. There were 6 included in the 1954 request.

Mr. BECKWORTH. So instead of having 586, if you could fill the 7, and get the 6 more, you would have 601?

Mr. HENSLEY. Mr. Chairman, if I might explain, it is just hardly possible to keep the full complement staffed all of the time. I mean we have resignations, and we have that problem.

Mr. BECKWORTH. That is understandable, and so you have roughly 600, then, instead of 585, or 586, if you could get what you wanted?

Mr. HENSLEY. That is right.

Mr. BECKWORTH. You would not have very many more if you received what you actually asked for. You would have probably not enough to change in the main the practices which you are currently carrying out.

Mr. HINSHAW. It goes further than that, and that is divided into five shifts, or something of that sort, if you are going to have round-the-clock operation at all of the airports of the United States, you have got to have at least five men for each position; do you not?

Mr. HENSLEY. I specify three shifts, but that is on a 7-day week, and so I certainly think that five shifts would be more reasonable as a figure, if you covered it.

Mr. HINSHAW. You cannot work them 7 days a week, you can only work them 40 hours a week, and there are so many hours in a week, and it requires pretty close to five shifts.

Mr. HENSELY. That would be right.

Mr. HINSHAW. And so if you divide by 4 you have about 150 airports to be covered by one man and at each airport there are 24 hours in a day. How many airports are there, certificated by the CAA, approximately?

Mr. HENSLEY. Well, there are almost 600, sir.

Mr. HINSHAW. That gives you an idea of what it takes to supply an adequate force of the positions that have to be rotated, to go around the clock.

Well, now, Mr. Chairman, I have got to make a very important phone call in a minute, and I wondered if I might get back to the original subject. I hate to harp on this subject of airports and runways so long, but our friend here who was testifying before the committee on the subject of runways and proper lengths, and so forth, I wonder if I could ask him one or two questions before I have to leave.

Mr. Welling, will you come forward again? Will you give a typical example of a difference in runways required—perhaps that is not a fair question because as I understand it all aircraft used in common carrier service except the C–46 must meet part IV requirements except perhaps the DC–3 and the Lockheed Lodestar. Is that correct?

Mr. WELLING. That is correct.

Mr. HINSHAW. And they are quite old airplanes.

Mr. WELLING. Yes, sir.

Mr. HINSHAW. But they did have certain requirements under part IV or what is presently part IV at a previous time, did they not?

Mr. WELLING. The DC–3 and the Lockheed, you mean?

Mr. HINSHAW. Yes, they are certificated under part III.

Mr. WELLING. They were certificated under earlier parts of the regulations. The DC–3 was certificated under Bulletin 7–A, issued by the Secretary of Commerce back in 1928, but there was a version of the bulletin still effective when the DC–3 was certificated as a type.

Mr. HINSHAW. There are certain lengths of runways that are required for the DC–3 operation, is that right? At least the DC–3 has certain characteristics of landing and take-off that are well known to be within certain limitations at a given altitude, is that correct?

Mr. WELLING. The situation is this, that the performance of the DS–3 and the Lockheed are such that they could comply with the rules laid down for transport category airplanes at weights at sea level in excess of those at which they are permitted to operate.

Mr. HINSHAW. Therefore, they would now be meeting the transport category requirements.

Mr. WELLING. Yes, sir.

Mr. HINSHAW. So we are talking about the C–46, and have any requirements or any similar requirements been set up for the C–46 in common carrier operation?

Mr. WELLING. There are requirements similar in their nature but not so severe as those required of transport category airplanes; that is right.

Mr. HINSHAW. That is where I want to get into a discussion, and have you explain the differences and how many they are and why.

Mr. WELLING. Well, I am not sure at the moment that I can do that without reference to some material which I do not have. Let me see if I can get it.

Mr. HINSHAW. May I ask offhand if the differences are material?

Mr. WELLING. I would say they were, sir; but I think I can point them out if you will allow me to examine this document a moment.

The requirements which apply to airplanes not certificated in the transport category but used by irregular air-carrier operators cover a take-off and en route and a landing requirement. The take-off requirement says—and I will read it if you like:

> No take-off shall be made except under conditions which will permit the airplane to be brought to a safe stop within the effective length of the runway from any point on take-off up to the time of attaining, with all engines operating at normal take-off power, 105 percent of the minimum control speed, or 115 percent of the power of stall speed in the take-off configuration, whichever is greater, as shown by accelerated stop-distance data.

The corresponding requirement applicable to transport-category airplanes says the airplane shall not be taken off at a weight in excess of one such that if the engine failed anytime during the take-off it could either be brought to a stop within the available length of runway or continue with the engine in operation and climb at certain minimum specified rates. It is that latter element which is missing from this requirement.

Mr. HINSHAW. That is to continue the take-off and climb at a minimum rate.

Mr. WELLING. Yes, sir; and the second element in this set of requirements is a requirement that the airplane climb at a certain minimum specified rate in the cruising configuration in the event it loses an engine at a minimum distance above any point of terrain over which it must fly.

Mr. HINSHAW. That is at 1,000 feet.

Mr. WELLING. I believe that is the figure, sir. Yes, sir; that is right.

Now, there is a similar requirement applicable to transport-category airplanes, except that the rate of climb specified for the nontransport-category airplane is 50 feet per minute, and for the transport-category airplane it is specified as a multiple of the stalling speed of the airplane squared; so that, if for example, the stalling speed in that configuration were 100 miles per hour, the requirement would be 200 feet per minute if the airplane weighed less than 40,000 pounds, and if it weighed more than 60,000 pounds the required rate of climb would be 400 feet per minute.

The third element in this set of requirements is a landing-distance limitation. I will read it if you will permit me. [Reading:]

No airplane shall be taken off at a weight in excess of that which under standard conditions hereinafter stated in paragraphs A and B would permit the airplane to be brought to rest at the field of intended destination within 70 percent of the effective length of the runway from a point 50 feet directly above the intersection of the obstruction clearance line of the runway.

The corresponding requirement for transport-type-category airplanes is substantially the same except that for a scheduled destination the specified percentage of the runway which may not be exceeded is 60 percent. But there is a proviso which permits, in the event the airplane is forced to go to alternate destinations, dispatch at a weight such that that distance would be as much as 70 percent of the length of the runway at the alternate.

Mr. HINSHAW. I do not want to get into a long discussion here, but I think it would be well for Mr. Welling to prepare a statement to include in his remarks concerning the ability of the C–46 airplane to meet the requirements which he has stated thereon runway 24 at Newark Airport and consideration of the altitudes which must be reached on the take-off.

Mr. BECKWORTH. I think it would be well to relate that to the other airports too, up in that territory.

Mr. HINSHAW. Yes. It could be related to certain other runways; for instance, at LaGuardia. I am sure they are long enough in Idlewild—they are very long runways—and also at Teterboro.

Mr. WELLING. May I be sure I understand you. You want a statement concerning the extent to which the C–46 complies with these rules I have just identified as applicable to irregular carriers at these locations.

Mr. HINSHAW. And at the maximum gross weight allowable prior to this in the event you are reducing the gross weight to 45,000 pounds, and also as to whether or not it applies to 45,000 pounds.

Mr. WELLING. Yes, sir.

Mr. BECKWORTH. It would not necessarily be confined merely to the irregular carriers; would it?

Mr. HINSHAW. Well, not necessarily, because other carriers use the same type of aircraft.

Mr. BECKWORTH. It is for transporting cargo as contrasted with passengers.

(The information requested is as follows:)

In respect to the operation of the C–46 airplane in and out of Newark and LaGuardia at certificated gross weights of 48,000 pounds and 45,000 pounds, the

following limitations prevail, as established by the Normal Category Airworthiness Rules of CAR 3 and the Irregular Air Carrier Rules of CAR 42:

Newark Airport

	Feet
Runway 24 and 6:	
Effective length for take-off and landing	6,658
48,000 pounds take-off distance	4,960
Landing distance	3,215
45,000 pounds take-off distance	4,580
Landing distance	4,110
Take-off and landing limitations	None
Runway 10:	
Effective length for take-off	5,720
For landing	6,000
Runway 28:	
Effective length for take-off	6,000
For landing	5,720
Take-off and landing limitations	None
48,000 pounds en route terrain clearance limitation	5,720
45,000 pounds en route terrain clearance limitation	7,200

As can be seen, no effective weight limitation is imposed on the C–46 as presently certificated by runway 24–6 and 28–10 at Newark.

Regarding the inconsistency of landing distance versus gross weight that appears in (i. e., a shorter landing distance for a heavier weight) it is felt that the 48,000-pound figure of 3,215 feet is questionable, and it is presently in litigation before the CAB. At the time of publication of CAR 42, it required the CAA to publish values of take-off and landing distance for all large airplanes used by irregular carriers, based on data available within the CAA. The regulation was adopted by the Board upon the understanding that data were available and therefore that no testing would be required. The C–46 data available were limited at that time, but the published figures were based on the best data at hand. Since that time CAA has conducted further tests on the airplane, and hence resolution of the differences revealed by the newer test data is presently in the hands of CAB.

Runway 1 and 19:		
Effective length for take-off and landing	feet	4,842
48,000 pounds take-off distance	do	4,960
Landing distance	do	3,215
45,000 pounds take-off distance	do	4,580
Landing distance	do	4,110
Take-off limitation	pounds	47,100
Landing limitation	do	None
46,800 pounds en route terrain clearance limitation	feet	6,750
45,000 pounds en route terrain clearance limitation	do	7,200

LaGuardia Airport

Runway 4:		
Effective length for take-off	feet	4,680
For landing	do	4,320
Take-off limitation	pounds	45,850
Landing limitation	do	None
Runway 22:		
Effective length for take-off	feet	4,320
For landing	do	5,700
Take-off limitations for all model C–46 airplanes	pounds	42,220
Landing limitation	do	None
Runway 13:		
Effective length for take-off	feet	5,700
For landing	do	5,900
Take-off and landing limitation		None
Runway 31:		
Effective length for take-off	feet	5,900
For landing	do	5,700
Take-off and landing limitation		None

LaGuardia Airport—Continued

Runway 6:		
Effective length for take-off	feet	4,030
For landing	do	4,230
Take-off limitation for all model C–46 airplanes	pounds	37,740
Landing limitation	do	None
Runway 27:		
Effective length for take-off	feet	4,230
For landing	do	4,030
Take-off limitations for all model C–46 airplanes	pounds	40,900
Landing limitations for 48,000-pound airplane	do	None
Landing limitations for 45,000-pound airplane	do	44,000

Mr. WELLING. My point was to be clear which rules would be used in asssessing the airplane, and I have understood it is these which I have indicated are applicable to irregular air carriers, and the transport-category requirements.

Mr. HINSHAW. That would be correct, and of course I think it would be very interesting and in part conclusive to know how that airplane would act in reference to the transport category.

Mr. WELLING. Mr. Chairman, we have with us some information, which was requested last Friday, and we have with us information to be included in the record stating the status of the airplane with respect to the transport-category requirements.

Mr. HINSHAW. Would it take very long to give us the gist of that and place the rest of it in the record?

Mr. WELLING. It is three pages double-spaced, and I could read it, if you like.

Mr. BECKWORTH. Will you read it, please.

Mr. WELLING. The following data are extracted from the Civil Aeronuatics regulations, Engineering Flight Test Report on C–46 airplanes, Transport Category Performance dated March 7, 1951.

In preface, it should be understood that the transport-category requirements of CAR 4b are an instrument for defining a minimum level of safety. This level of safety is expressed in various ways relative to the airplane (viz., maximum weights for take-off and landing, minimum runway lengths for take-off and landing, operating speeds and engine condition which it has been demonstrated may be safely used, etc.).

The transport-category requirements limiting the take-off weight function by requiring a specific positive rate of climb following the sudden and complete loss of power of one engine at the most critical point of take-off (i. e., that point at which the airplane can either be brought to a safe stop within the length of runway available ahead of the airplane, or alternatively flown safely off the runway, with a net height of 50 feet attained by the time the airplane passes over the runway end).

Two "segments" of the take-off flight path define the operating level of safety or take-off performance:

First segment climb, which requires a net rate-of-climb of 50 feet per minute following complete engine failure at the critical engine failure speed described above, with the landing gear extended, wing flaps in the take-off position, and the propeller of the failed engine windmilling in take-off pitch.

At sea level, in conditions of standard temperature and humidity, the C–46 is limited in this segment to a take-off weight of 38,050

pounds. At a field altitude of 5,000 feet (Denver, for example) the take-off weight would have to be reduced to 31,900 pounds. If the C–46F were to demonstrate its performance in this configuration at its present operating weight of 48,000 pounds, it would have, instead of a 50-feet-per-minute rate-of-climb at sea level, a rate-of-sink of some 197 feet per minute. As a matter of fact, in order to have no rate-of-sink, but merely a zero rate-of-climb, the weight would have to be reduced to 39,850 pounds.

Second segment climb, which requires a net rate of climb equal in feet per minute to the arithmetic product of the square of the stalling speed (expressed in miles per hour) multiplied by the factor 0.035, demonstrated at the minimum safe take-off speed with the landing gear retracted, but all other airplane devices in the same position as in the first segment climb just described.

At sea level the C–46F is limited in this segment to a take-off gross weight of 36,200 pounds, and at a field altitude of 5,000 feet this weight would be reduced to 31,650 pounds. If examination of the C–46F at its present certificated weight were made to the second segment climb requirement of the transport category, instead of demonstrating the required climb of 304 feet per minute, the airplane would sink at a rate of 105 feet per minute. The weight at which a zero rate of climb could be met would be in the order of 43,900 pounds.

As can be seen, the second segment climb requirement is the more critical of the two, and limits the certificable weight of the C–46F to 36,200 pounds. The empty weight of the airplane equipped for passenger operation is somewhere in the neighborhood of 31,000 pounds.

The landing climb requirement of the transport category allows the C–46F a maximum landing weight of 46,500 pounds. However, this requirement is overridden both by the approach climb requirement (which fixes the landing weight) and the take-off climb requirements, which render any landing weight in excess of the take-off weight unusable in any case.

The approach climb requirement, which conceives a missed approach with an engine already inoperative and its propeller feathered, permits a maimum landing weight at sea level of 44,325 pounds. However, since the take-off weight could not exceed 36,200 pounds, this landing weight is without practical significance.

The primary reason that the weight of the C–46F is some 25 percent lower in the transport category than in its presently certificated normal category of CAR 3 is that no take-off ability following engine failure is contemplated in the normal category. The ability to remain aloft with one engine inoperative and in the most advantageous airplane configuration (landing gear and flaps retracted, inoperative propeller feathered, and continuous rather than take-off power on the remaining engine) is the limiting criterion in CAR 3, and this is insured by requiring a rate of climb in this configuration of 142 feet per minute for the 48,000-pound airplane.

Mr. HINSHAW. Then the question becomes one of how we got beyond the point or up to the point where the transport category should apply to all aircraft in common-carrier service; is that correct?

That is not a fair question, I suppose. Of course, I would like to know, Mr. Chairman, how we arrived at that point where an airplane of this size and for the use in common-carrier service could have been

certificated under part III, and why it should not have been required to be certificated under whatever was the predecessor of part IV, in existence at the time it was certificated.

Mr. WELLING. I believe, sir, that that phase of this question was covered by Mr. Chamberlain's testimony last Thursday.

Mr. HINSHAW. He just said that it had been certificated because it had been offered under part III rather than under part IV, and that there was no disability placed against the Civil Aeronautics Authority at that time, and I guess it was the Board and the Administrator at that time, to require that it be certificated under part IV.

Mr. WELLING. So far as the Civil Aeronautics Administration is concerned our situation was this: The law says any interested person may apply for a type certificate, and the authority shall conduct such investigation as is required to determine compliance with the regulations, and that the type is a safe type and if it so finds it shall issue the certificate. The regulations, part III, existed. We saw no ground on which to refuse a valid application for certification of the airplane under that part.

Mr. HINSHAW. That is a flat statement of fact, and whether it can be controverted or not is another subject, but my personal belief is that if you are going to carry passengers in common-carrier service aircraft-carrying passengers, whether it be in irregular or scheduled common-carrier service, the same regulations should apply. However, as you say, part III was available. Now, why it was not shut off when this airplane was offered, I do not know. Perhaps somebody else knows, and it may be in the records. Maybe there was no question ever advanced on the subject, but there it is, Mr. Chairman. Obviously, we have an airplane flying in common-carrier service which does not meet the transport category requirements, and yet it continues to carry passengers and cargo. It has the characteristics which you have outlined here in respect to the ability to climb, and the ability to take off, and so forth and so on. It is very interesting, I am sure, to the committee.

Mr. BECKWORTH. The committee will adjourn at this time, subject to the call of the Chairman, and I imagine we will try to meet tomorrow afternoon at 2 o'clock.

(Thereupon, at 4 p. m., the committee adjourned, subject to the call of the Chair.)

AVIATION SAFETY

MONDAY, FEBRUARY 25, 1952

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE OF THE COMMITTEE ON
INTERSTATE AND FOREIGN COMMERCE,
Elizabeth, N. J.

The subcommittee met at 10 a. m. in the Freeholders Council Chamber, County Building of Union County, Elizabeth, N. J., Hon. Arthur G. Klein (acting chairman) presiding.

Mr. KLEIN. The hearing will come to order. The first witness will be John F. Sly, commissioner for the Port of New York Authority.

STATEMENT OF JOHN F. SLY, COMMISSIONER, PORT OF NEW YORK AUTHORITY

Mr. KLEIN. Your name and address, please, for the court reporter.

Mr. SLY. My name is John F. Sly, and I am commissioner of the Port of New York Authority for New Jersey. I live in Princeton, N. J.

Mr. KLEIN. You may proceed with your statement, Mr. Sly.

Mr. SLY. Mr. Chairman, members of the committee, I appear here as the spokesman for the commissioners of the Port of New York Authority. I am accompanied by all of my fellow commissioners who are available in the port district at this time. I should appreciate, Mr. Chairman, the privilege of introducing them to the committee: Commissioner Joseph M. Byrne, of Newark, N. J., vice chairman; Commissioner Horace K. Corbin, of Newark; Commissioner F. Palmer Armstrong, of Keyport; Commissioner Bayard F. Pope, of New York; Commissioner S. Sloan Colt, of New York; Commissioner Charles S. Hamilton, Jr., of New York, who is not here right now but will be here; and Commissioner Charles H. Sells, of New York, whom I also expect to be here.

Now, we have brought with us the members of our technical staff in order that you may have the advantage of their technical testimony if you care to develop it as the hearing proceeds. I would like to introduce them also at this time: Austin J. Tobin, executive director for the Port of New York Authority; Fred M. Glass, director of the department of aviation development of the Port of New York Authority; Sidney Goldstein, general counsel of the port authority; Karl G. Clement, controller; John M. Kyle, Jr., chief engineer; and Russell E. Watson, New Jersey, associate counsel.

When the appointment of this committee was announced on January 25, the chairman of the port authority, Mr. Howard S. Cullman, made the following public statement:

> The commissioners of the port authority agree on the desirability of a congressional investigation of the tragic airplane accident at Elizabeth last Tuesday afternoon. We are confident that the committee's investigation of civil air safety regulations, pilot training practices, airport equipment and location, electronic equipment and maintenance of engines and airplanes will result in findings and recommendations that will be in the public interest.

At that time also, our executive director, Mr. Austin J. Tobin, wrote you, Mr. Chairman, as follows:

> We have just been advised of the appointment of the Interstate and Foreign Commerce Committee in the House of Representatives of a subcommittee charged with the responsibility of investigating all phases of air travel and embracing therein studies with respect to Newark Airport and LaGuardia. The Port of New York Authority, as you undoubtedly know, operates these two major aviation facilities under a leasing agreement with the cities of Newark and New York, respectively. I am writing this note to assure you of our complete and wholehearted cooperation with you and the other members of the committee in carrying forward the very important responsibility assigned to you. I presume that you will advise us of information, testimony, and so forth, desired by you and your committee.

I need hardly say, Mr. Chairman, that the commissioners of the port authority share fully and very deeply the grief and concern all of our citizens have over the recent tragic aircraft accidents in Elizabeth.

With the members of your committee, with all other public officers of good will and sincere purpose, we turn from our sorrow to the duty of weighing the lessons that can be learned from this tragedy and to the sober consideration of those advances in safety and security which must result from transportation accidents such as these. It is this duty of intelligent and constructive consideration that is exemplified in the purpose and the statement of the objectives of your committee. It is this determination to give constructive meaning to the tragedies such as these that, throughout the history of American industry and transportation, has brought consoling rewards of increased protection and future safety. It is particularly appropriate, therefore, that a Committee on Interstate Commerce such as this, should devote itself to this important task.

In order that inquiry and consideration of the problems of the public which confront not only northern New Jersey, but the entire Nation, as a consequence of the three tragic accidents in Elizabeth, could proceed in a sober, intelligent, and constructive atmosphere, the port authority closed Newark Airport in the early morning hours of February 11, 1952, with the following announcement:

> In the light of these tragic events and pending further investigation, the Port of New York Authority has closed all runways at the Newark Airport as of 3 o'clock this morning and a notice to airmen has been issued to that effect.

The same day—that is, February 11, 1952—the commissioners of the port authority invited the Chairman of the Civil Aeronautics Board, the Administrator of Civil Aeronautics, the top executives of all United States flag airlines serving the metropolitan area of northern New Jersey and New York, the Airline Pilots Association, and the Air Transport Association to meet with them in New York on the following day. The invitation was accepted by all of the foregoing and after meeting throughout the afternoon and evening of February 12, the

group unanimously agreed upon and issued the following public statement:

1. Newark Airport will not be reopened for passenger and cargo flights pending congressional and other responsible official investigation.

2. With respect to the transfer of Newark Airport operations to New York International, La Guardia and Teterboro Airports, Civil Aeronautics Administrator Horne said: "That the CAA would exercise its statutory reponsibility for the control of aircraft movements into the airport in the interest of maximum safety and that the number of such movements would be based upon weather and other operating considerations."

3. Administration Charles Horne of the Civil Aeronautics Administration stated that the CAA will do everything within its statutory power to enforce the observance of runway priorities for take-offs which have already been recommended by a joint committee of airlines, the Airline Pilots Association, the CAA, and the port authority. These priorities apply at both LaGuardia and New York International and provide for the utilization of runways at these two airports which permit take-offs over water or the most sparsely settled areas as a matter of first choice. Under these plans, runways requiring operation over congested areas would be utilized only when such use is mandatory for reasons of safety. It is anticipated that this procedure will substantially reduce the volume of operations over congested areas in the vicinity of these two airports. The airlines and the Airline Pilots Association, for their part, state that they will assume their respective responsibilities for enforcing and observing these priorities, subject to the judgment of the pilot with his ultimate responsibility for the safety of the flight.

4. The presidents and officers of the scheduled and nonscheduled airlines, and the commissioners of the port authority, present at the meeting, agree on the following statement of general responsibility for the operation of aircraft into and out of airports: "Under the Federal law, the powers of the operator of an airport—the port authority in the case of northern New Jersey and New York—are limited to the land and structures which constitute the airport. The airport operator's functions include the financing, planning, and construction of runways, utilities, terminal buildings, hangars, and the extensive physical plant required for the operation of a large air terminal. Even in the discharge of these functions, the Civil Aeronautics Administration under the Federal Airport Act exercises a guiding hand. In the exercise of its paramount power under the Constitution to regulate interstate and foreign commerce, the Congress of the United States has placed the complete control of air traffic and aircraft approach procedures within the jurisdiction and administration of the Civil Aeronautics Administration and the Civil Aeronautics Board. Accordingly, the Civil Aeronautics Administration operates the control towers at major terminal airports throughout the country, employs all of the control tower personnel, and furnishes all of its equipment, including all electronic, radar, and other devices concerned with the direction and control of air traffic. These include the intercommunications system between the tower and the airplane; the instrument landing system commonly known as ILS; the ground control approach system commonly known as GCA, and the tower radar commonly known as surveillance radar. The port authority or any other airport operator has nothing whatsoever to do with the installation, maintenance, or operation of such facilities at the airport, or with the control of their traffic into or out of the airport, with the exception of providing the physical space for the CAA equipment and for the housing of the Federal employees who maintain and operate it. So, too, the port authority leases ground and building space to the airlines and has no control of, authority over, or voice in the maintenance or operation of their aircraft. Airlines and other aircraft operators are governed by the orders and regulations of the Civil Aeronautics Administration and the Civil Aeronautics Board, and in establishing their own operating procedures, must conform to prescribed standards. So, too, those agencies of the Federal Government have power to establish or approve all operating procedures of the airlines, including the standards and determination of pilot competency, the airworthiness of aircraft, legal minimums of ceiling and visibility for the aircraft operation at the airport itself, all air traffic control, and procedures for approaches and take-offs. Our joint purpose in setting forth this statement of the division of operating responsibilities at airports is to set forth clearly the respective jurisdiction of the Civil Aeronautics Board, Civil Aeronautics Administration, the aircraft operator, and airport operator, since an understanding of this division of responsibility is essential to intelligent consideration of the problem before us."

For the record, the foregoing statement was issued to the press on February 12 over the names of the following, all of whom were in attendance at the meeting:

Robert M. Love, president, All American Airways, Washington, D. C.; Alfred A. Lane, vice president, operations, Northeast Airlines; E. J. Kershow, vice president, operations, National Airlines; John Paul Riddle, president, Riddle Aviation Co.; William H. Meranda, Resort Airlines; O. M. Mosier, American Airlines; J. B. Franklin, Capital Airlines; Eddie Rickenbacker, president, Eastern Airlines; Warren Lee Pierson, TWA; Milton W. Arnold, ATA; Harold R. Harris, vice president, PAA; M. Van Dusen, public relations, Eastern Airlines; Donald A. Duff, vice president, Colonial Airlines; J. E. Griffin, United States Airlines; Thomas L. Grace, president, Slick Airways, Inc.; Irving M. Buckley, Trans Caribbean Air Lines; O. Roy Chalk, president, IMATA; R. I. Lennox, Airline Pilots Association; Wells F. Bruen, Air Coach Transportation Association; Frank Judd, Northwest Airlines; L. Burwell, Flying Tiger; Donald Nyrop, Chairman, CAB; Walter H. Neff, assistant to the president, United Air Lines; Carl A. Benscafer, Robinson Airlines; Melvin C. Rehill, Air Coach Transportation Association; C. F. Horne, CAA; Horace K. Corbin, commissioner, PNYA; Fred M. Glass, port authority; Austin J. Tobin, executive director, PNYA; Bayard F. Pope, commissioner, PNYA; S. Sloan Colt, commissioner, PNYA; John F. Sly, commissioner, PNYA; Charles S. Hamilton, commissioner, PNYA; F. Palmer Armstrong, commissioner, PNYA; Charles H. Sells, commissioner, PNYA; Ben Stern, CAA.

At the same meeting of February 12, 1952, a special committee was established to coordinate the joint efforts of all concerned in meeting the problems of safe operation of aircraft over cities and other populous areas. This committee was called the National Air Transport Coordinating Committee, its chairman is Capt. Eddie Rickenbacker, and it includes among its members Juan Trippe, president, Pan American Airways; Ralph Damon, president, Trans World Airlines; W. A. Paterson, president, United Air Lines; C. R. Smith, president, American Airlines; Charles F. Horne, Administrator of Civil Aeronautics; O. Roy Chalk, president, IMATA—that is the Independent Military Air Transport Association; Thomas L. Grace, president, Slick Airways; Donald W. Nyrop, Chairman, Civil Aeronautics Board; Howard S. Cullman, chairman, the Port of New York Authority; Clarence M. Sayen, president, Airline Pilots Association; J. H. Carmichael, president, Capital Airlines; Amos E. Heacock, president, Air Coach Transport Association; G. T. Baker, president, National Airlines; and Admiral Emory S. Land, president, Air Transport Association.

This committee met all day and through the evenings both Friday and Saturday, February 15 and 16, and took definite action to meet emergency conditions arising out of the suspension of operations at Newark Airport.

As the committee knows, most of these actions involved the most difficult and critical problems for the members of the National Air Transport Coordinating Committee, yet they were all taken voluntarily, which is indicative of the constructive and cooperative approach of this coordinating committee to its task. I shall not discuss

the work of this committee or the agreements reached on February 12, 15, and 16 in any further detail, for I assume that Captain Rickenbacker and other members of this committee, such as representatives of the Civil Aeronautics Board, Civil Aeronautics Administration, and the Airline Pilots Association, will appear before you.

Now, gentlemen, may I discuss briefly the resumption of passenger and cargo flights at the Newark Airport. As I pointed out, it would not be appropriate or even possible today for me to even discuss conditions under which passenger and cargo flights should be resumed at Newark Airport. The answer involves very broad and critical problems, both regional and national, as well as the determination of technical conditions and procedures that will assure the people that all possible considerations of safety have been thoroughly canvassed by those qualified to do so. The constructive advice which we all seek falls within the assigned responsibilities of your committee, the President's Airport Commission headed by General Doolittle, the recommendations of the Interstate and Foreign Commerce Committee of the Senate, of the CAB, the CAA, the New Jersey Legislative Committee, the Rickenbacker National Air Transport Coordinating Committee, and the port authority itself.

All of these responsible executive, legislative, administrative, and industry committees will weigh the very grievous and far-reaching regional and national problems that are involved in the resumption of air service to northern New Jersey.

I think it is apparent to all thinking people that these problems involve the future welfare, development, and prosperity of northern New Jersey and of the United States itself—perhaps their very survival. When one thinks them through, these problems involve the entire policy of the Federal Government as set forth in the Civil Aeronautics Act of 1938 to go forward with the encouragement and development of an air transportation system properly adapted to the present and future needs of the foreign and domestic commerce of the United States, of the postal service, and of national defense.

Practically all of the airports of the large cities of the country are located in heavily populated areas. If they were not heavily populated when the airport was first constructed, the areas around its perimeters rapidly became so. That is what happened around LaGuardia—which now has congested residential areas closer than those at Newark—but which at the time of its construction in 1936 was surrounded by sparsely settled areas. I may say in passing that despite the noise of aircraft, there is nothing mysterious about the attraction of residences and developing industries to the areas around the airports of the country. It becomes clear as we consider, for instance, that today no less that 17,000 people with an annual payroll of about $75 million are employed right here in the port district at Newark, LaGuardia, and New York International Airports.

The fact is, as you know, that Newark, LaGuardia, and New York International Airports are of a pattern with the major urban airports of the country in that they have been developed in close proximity to populous areas, or have attracted concentrations of population and industry to their perimeters. I am advised that no less than 62 of the principal airports in the United States have residential areas closer to the end of their runways than the distance from runway 6–24 at

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Newark to the city of Elizabeth. These include Boston, Chicago, Cleveland, St. Louis, Kansas City, St. Paul-Minneapolis, San Francisco, Los Angeles, Atlanta, and Miami.

Now, as to our construction program at Newark Airport. It has been suggested to your committee that the construction program that is now under way at Newark should be terminated or suspended. I know of no course that would be so damaging to the objectives of increased safety and security that are so earnestly sought by the members of this committee and the commissioners of the port authority.

That construction program is being carried forward in fulfillment of the plans for the reconstruction of Newark Airport, which were undertaken by the port authority over 4 years ago. Included are the building of new runways, with new alinements, and the abandonment of the existing runways, as a constructive and realistic step toward modernizing the airport and reducing the movement of aircraft over congested areas. This master plan of reconstruction was the prime obligation of our whole airport agreement with the city of Newark, the airport policy of the States of New York and New Jersey, as expressed in their joint statutes, to which I shall presently refer, and the assistance that we have received through the Federal airport aid program.

The construction of these completely new runways, or substantially different alinement from existing runways, will provide for the approach and departure of aircraft so as to avoid the central and congested residential districts of Elizabeth. It is estimated that when these new runways are completed and with adherence to the runway preference system, only a relatively small percentage of the traffic will take off or depart over the residential area to the west of the airport and during instrument conditions that approach will not be used at all. I repeat that such avoidance of central and congested residential districts through the reconstruction of the airport was one of the factors of the whole plan of airport development which the port authority undertook in 1948, at the request of the city of Newark.

In our annual report to the Legislatures of New York and New Jersey for 1950, we said that this new runway program was designed to make possible to a great degree the avoidance of residential districts in Newark and Elizabeth for aircraft approaches and departures. This basic program for the realinement of the Newark runways was outlined in the airport's proposal which we submitted to the commissioners of the city of Newark in 1946. At that time we said:

> The present airport will be obsolete within 5 years because of the inadequacy of existing runways and terminal installations. Within that period it will therefore be necessary to construct a new airport to replace the existing facility.

In accordance with these plans, the port authority let the first contract for the new runways A and D on January 12, 1950. Since then this work was expedited wherever possible. Even with diligent effort, the construction of runway A alone requires a minimum of 33 months. The building of safe, level, and durable runways at Newark Airport has required the placement of 3,300,000 cubic yards of hydraulic fill up to a height of 16 feet to expedite the settlement and consolidation. This one operation for runway A requires 28 months, since it takes that long to place the fill and to wait for the maximum soil settlement of about 4½ feet to occur.

If the work is not interrupted, the first of these new runways, runway A, is scheduled for completion by November 1 of this year. It is estimated that it will be operational about 94 percent of the time for all aircraft approaches and take-offs.

Of this runway, Capt. Eddie Rickenbacker, president of Eastern Airlines, has said:

> Runway A, when completed and implemented, will provide Newark with one of the finest and safest instrument runways in the world and will permit the landing and take-off of aircraft under both visual flight rules and instrument conditions without flying over the congested residential or downtown business areas of Elizabeth.

I should make it clear also, though our director of aviation development, Mr. Fred Glass, will go into these matters in greater detail, that it was always intended that just as soon as the new runway A was completed, which under present construction schedules was to be about November 1, 1952, the existing instrument runway, which was constructed by the city of Newark on an alinement which carries planes directly over the center of the city of Elizabeth, was to be closed to the landing and take-off of aircraft.

Now, may I comment on the nature of the responsibilities and functions of the port authority. At the previous hearings before this committee and recently also in the statements of local officials which have appeared in the press, statements have been made regarding the nature, responsibilities, and functions of the Port of New York Authority which are inaccurate and misleading. We think it is important, therefore, that the record before your committee include a brief summary or review of the statutory facts with regard to this agency of the States of New Jersey and New York.

The Port of New York Authority was organized in 1921, under the terms of a compact, or treaty, as it has sometimes been called, between the States of New Jersey and New York as the self-supporting regional agency of our two States. The compact had the consent of the Congress. By the terms of the compact of 1921, the port authority was directed to go forward with the development of public terminal and transportation facilities within the port district of northern New Jersey and New York. The whole economy of this area has developed around our geographical and man-made position as a great center of transportation, by sea, by land, and now by air. There are 4 million people employed in this great metropolitan area. Of that number, about 400,000 earn their living directly or indirectly in the transportation industry—the movement of persons and cargo through the port district of northern New Jersey and New York. It is clear, therefore, why the two States declared in the port compact, that a—

> better coordination of the terminals, transportation, and other facilities of commerce in, about, and through the port of New York will result in great economies benefiting the Nation as well as the States of New York and New Jersey.

The port authority was the first public authority organized in the United States. The statesmanship which produced the compact was shared by leaders in both States and particularly by Gov. Walter E. Edge here in New Jersey and Gov. Alfred E. Smith in New York.

The two States designated the port authority as their "joint or common agency" for the purpose of developing the port of New York. The statutes declare it to be "performing an essential governmental function" and to be "the municipal corporate instrumentality of the

two States for the purpose of developing the port and effectuating the pledge of the States in the said compact."

The compact of 1921 between the States of New Jersey and New York declares that the development of the public terminals, transportation, and other facilities of commerce in the port district "will require the expenditure of large sums of money and the cordial cooperation of the States of New York and New Jersey in the encouragement in the investment of capital, and in the formulation and execution of the necessary physical plan"; and that such result can best be accomplished through the cooperation of the two States by and through a joint or common agency.

The compact supplemented the old treaty of 1834 between the two States with a mutual pledge of faithful cooperation in the future planning and development of the port of New York; and by the creation of the port of New York district with specific boundaries which include roughly that part of the metropolitan region within a radius of 25 miles of the Statue of Liberty. The compact of 1921 then created the Port of New York Authority as the agency of the two States.

In order that the port authority might carry out the tremendous and continuing task of developing the public terminal and transportation facilities of this metropolitan area, the two States clothed it with all necessary and appropriate powers of port and terminal development, with the important exception of the power to tax or to levy assessments. This reservation is the key to the whole concept of the port authority, which is that of a self-supporting agency, whose public projects are carried on through the development of their own revenues and charges, and which impose no burden on the general taxpayer.

The two States agreed that the port authority should "constitute a body, corporate and politic, with full power and authority to purchase, to construct, lease, and operate any terminal or transportation facility within the port district."

The treaty's outline of the terminal and transportation facilities which the port authority was to construct or operate is comprehensive. It includes specifically: Tunnels, bridges, wharves, piers, docks, grain elevators, and—

> every kind of transportation, terminal, or storage facility now in use or hereafter designed for use for the transportation or carriage of persons or property or for the handling, storage, loading, or unloading at steamship, railroad, or freight terminals.

In 1922 the two States supplemented the compact by the adoption of a comprehensive plan of port development which was also consented to by Congress. That plan set forth the basic principles upon which the development of the port area should proceed, and provided that—

> The Port of New York Authority is hereby authorized and directed to proceed with the development of the port of New York in accordance with said comprehensive plan as rapidly as may be economically practicable and is hereby vested with all necessary and appropriate powers not inconsistent with the Constitution of the United States or of either State, to effectuate the same, except the power to levy taxes or assessments. The port authority shall be regarded at the municipal corporate instrumentality of the two States for the purpose of developing the port and effectuating the pledge of the States in the said compact, but it shall have no power to pledge the credit of either State or to impose any obligation upon either State or upon any municipality, except as and when such power is expressly granted by statute, or the consent of any such municipality is given.

Under such a charter, and as specifically directed from time to time by the statutes of the two States, the port authority has gone forward over the past 30 years with the construction and operation of bridges and tunnels over and under the interstate waters of the harbor, and of piers, airports, and other terminal facilities around its shores. We have built consolidated union terminals for trucks, busses, and the railroads. We are financing the development of the four airports of this area, a population center which, I may say, requires more passenger and cargo traffic than any other air center in the world. We have issued port-authority bonds for these projects over the past 30 years in the total amount, including those issued for refunding purposes of over $700 million.

During the course of your previous hearing here in Elizabeth, it was said that the port authority had exceeded the responsibility that had been vested in it by the two States. I think the foregoing recital of the extensive and difficult tasks which were specifically assigned to us in the compact and the statutes, is its own answer to that statement.

I should say, furthermore, in the same context, that each one of the bridges, tunnels, piers, terminals, and airports that have been constructed by the port authority have beeen preceded by, and have been the subject of specific legislation, jointly adopted by the two States by way of supplements to the original compact.

The airport legislation, to which I shall presently refer, was adopted by the Legislature of New Jersey, after a public hearing, and by a unanimous vote in the State senate and with only one dissenting vote in the assembly. It was adopted by the Legislature of New York by a unanimous vote of both the State senate and assembly.

The direction of the port authority's affairs is vested in 12 commissioners, 6 appointed by the Governor of each State, with the advice and consent of the Senate. We serve for overlapping terms of 6 years each. The commissioners receive no salaries or compensation whatsoever. Our New Jersey commissioners are subject to removal for cause by the senate; our New York commissioners by the Governor. The minutes of our meetings must be submitted to the Governors, and each Governor has a veto power over the actions of the commissioners from his State.

May I just comment for a moment on the responsibilities and duties of this commission. We are, first of all, officers of the respective States of New York and New Jersey, but we have large national and international responsibilities, particularly in the operation of our airports. In addition, we have strong personal and local responsibilities to our Government, and we represent the constituents of each State, although not in the same sense as though we had been elected.

Also, we must cooperate with at least five other agencies with responsibilities and interests in these airports, and we are constantly motivated by two very important responsibilities, that is, the responsibility of developing the commercial transportation within a great industrial area, and the responsibility of being prepared for any military emergency that may descend on these areas.

The revenues of the port authority may be used only in accordance with explicit bi-State legislation. Concurrent legislation adopted in 1931 entitled "An Act Regulating the Use of Revenues Received by the Port of New York Authority From or in Connection With the Opera-

tion of Terminal and Transportation Facilities" direct in great detail, not only the purpose for which port-authority moneys may be expended, but even the order in which such revenues must be allocated. In this connection, the Circuit Court of Appeals for the Second Circuit has said:

> The port authority is fully owned by the two States and its projects are all operated in the interest of the public without profit to private persons.

Now, I have heretofore pointed out to the committee that the broad directives of the compact have been implemented in every case by the adoption of specific bi-State legislation. I am going to ask our executive director, Mr. Austin J. Tobin, to review the history and record of the request of the commissioners of the city of Newark for a port-authority proposal for the future financing and development of Newark Airport, and I am going to ask him to review the background and record of Newark's acceptance of that proposal.

At this point, however, I think it is important for the committee to know that in 1947 and 1948, when both the city of Newark and the city of New York had asked the port authority to take over the responsibility for the future financing and development of the metropolitan airports, the policy of the two States was reviewed by the legislatures and then adopted in the form of a bi-State determination, under chapter 43 of the Laws of New Jersey, 1947, as amended by chapter 214 of the Laws of New Jersey, 1948; and under chapter 802 of the Laws of New York, 1947, as amended by chapter 785 of the Laws of New York, 1948.

The policy of our two States with respect to the development of the airports of the metropolitan district has heretofore been formally established in the following joint statutory pronouncements and agreements, so important to the issues which have been raised before this committee:

> The States of New Jersey and New York declare and agree that each terminal within the port of New York district serves the entire district, and that the problem of furnishing proper and adequate air terminal facilities within the district is a regional and interstate problem and that it is, and shall be, the policy of the two States to encourage the integration of such air terminals, so far as practicable, in a unified system. Accordingly, in furtherance of said policy and in partial effectuation of the comprehensive plan—of port development—heretofore adopted by the two States for the development of terminal and transportation facilities in the port of New York district, the States of New Jersey and New York agree that the port authority shall be authorized to effectuate, establish, acquire, construct, rehabilitate, improve, maintain, and operate air terminals within the port of New York district, and the two said States further agree that all cities and other States and local agencies shall be and they are hereby authorized to cooperate with the port authority in the development of their terminals, as hereinafter provided.
>
> Nothing herein contained shall be construed to authorize the port authority to acquire any air terminal owned or operated by any city, or any other property now or hereafter vested in or held by any other city, without the authority or consent of such city.
>
> The effectuation, establishment, and operation of air terminals by the port authority is and will be in all respects for the benefit of the people of the States of New York and New Jersey for the increase of their commerce and prosperity and for the improvement of their health and living conditions; and the port authority shall be regarded as performing an essential governmental function in undertaking the effectuation, establishment, or operation thereof.

Our agreement with the city of Newark was entered into on October 22, 1947, under the express authority of these legislative supplements to the compact of 1921.

Now, before I ask Mr. Tobin and Mr. Glass to review the material that has been assigned to them, there are several considerations of broad policy that the commissioners of the port authority have asked me to submit to the committee.

I would like, first, to correct a statement made before this committee by Mayor Villani and Commissioner Ellenstein, that the commissioners of the port authority had denied a public hearing to either local officials or the citizens of the Newark-Elizabeth area with respect to the noise problem of low-flying planes. The city officials of Newark or Elizabeth have never requested such a hearing. Senator Hand expressly invited our executive director, Mr. Tobin, to attend a meeting on September 21, 1951, of the Mayors' Committee which was attended by Mayor Villani, Mayor Kirk of Elizabeth, Commissioner Ellenstein, and others. Mr. Tobin promptly accepted the invitation, and he and Mr. Glass attended the meeting, and outlined the efforts of the port authority to meet the complaints about the noise of low-flying planes by the construction of the new runways. At that meeting, Mr. Tobin also committeed the port authority to go forward, as an interim measure of relief, with the new $175,000 taxiway which was opened on February 2, 1952.

We are actively participating in the work and studies of both the Newark-Elizabeth Mayors' Committee, where our general counsel, Mr. Goldstein, our director of aviation development, Mr. Glass, and other members of our staff are taking an active part in the studies and reports being prepared by the committee. So, too, we are represented and taking an active part in the work of a similar committee which was organized by the borough president of Queens. In his presentation here this morning, Mr. Glass will also review our extensive activity with CAA and the airlines, pointing out to them the seriousness of the noise problem and the need for their increased attention to this problem.

I need hardly repeat to the members of this subcommittee that the abandonment of Newark Airport—or moving it, which amounts to the same thing—and the abandonment of other airports equally close to populous areas, involves very grievous and far-reaching national problems that have to do with the future welfare, development, and prosperity of the whole country. In this atomic age it should be evident to anyone who will pause even for a moment and consider the consequences. It is perfectly evident that the very existence of this Nation depends upon their continued availability for the defense of our cities.

As I have already pointed out, defense measures play a very important part, not only from the standpoint of the defense of our own locality but from a national standpoint, and has become a factor which we must consider.

Also, I direct the attention of the committee to the fact that for the past 20 years or more, Newark Airport has been one of the critical airports in the entire system of air transport in the United States. It handles about one-third of the passenger traffic, and about one-half of the air cargo, of the most populous and prosperous industrial and transportation center in America—the metropolitan area of northern New Jersey and New York. The argument that has been advanced for its abandonment applies equally to almost every major urban air terminal in the United States. The question before this committee

or any other responsible committees that must consider this question, is whether or not we are to abandon, not just Newark Airport, but the whole development of air transport in this country.

Finally, such a decision must be considered in the light of such an informed statement as that made just a month ago by the Federal Government's Civil Aeronautics Administration, Mr. Charles F. Horne, that the three airports in the metropolitan area, including Newark—

fully meet the CAA regulations and the safety criteria developed by the CAA for the safeguarding of aircraft landing or taking off under instrument conditions.

At a hearing last week before a joint legislative committee of the New Jersey Legislature, the Chief of the New Jersey Bureau of Aeronautics, Mr. Frank E. Kimble, Jr., made the somewhat startling statement that he was positive that if Newark Airport had been under the jurisdiction of the State Board of Aviation, there might have been recommendations which he might have made in his official capacity, which might have gone a long way to prevent these disasters from occurring. I have said that this statement is somewhat startling, since I am about to read you the official views of Mr. Kimble's Bureau of Aeronautics as they appear in the lead item of that bureau's publication New Jersey's Flight Log for February 1952. I must assume that Mr. Kimble would not have written the following statement if he had any reservations as to the safety of Newark Airport, even after the second tragedy in Elizabeth on January 22:

In the wake of the two catastrophic incidents in the Newark metropolitan area, it behooves this Bureau to state its position with respect to the proper development of air terminal facilities in this area.

First, let's look at the record. (1) There has been no off-the-airport disaster attributed to flight of aircraft since the dedication of Newark Airport in 1929, until these two most recent incidents. (2) Subsequent to the first disaster, the hue and cry was that the large irregular air carrier segment of air transportation was responsible for this disregard of human lives. However, to get back to the record again, the nonscheds point to a record of no fatalities since early in 1949.

Factually and objectively, the State of New Jersey has consistently maintained that Newark Airport has established its position as a major eastern air terminal; that as part of our national system of air transportation, its immediate abolition would not contribute to the public welfare, and further that to advocate its removal is to admit that travel by air in all categories is not recognized as either desirable or necessary. This we cannot subscribe to.

With that, I would now like to introduce first, our executive director, Mr. Austin J. Tobin, whom we have asked to outline the background and history of our agreements with the city of Newark and the city of Elizabeth, and who will submit and summarize that agreement itself, and then, our director of aviation development, Mr. Fred Glass, whom we have asked to review the problems involved in the development of Newark Airport, its construction and its future operation.

Mr. KLEIN. Mr. Sly, would you prefer any questions addressed to you now, or wait until after these two gentlemen have given their statements?

Mr. SLY. That is entirely within your discretion, sir.

Mr. KLEIN. I think perhaps it would be better if you answered the questions now.

Let me say at the outset, because of the great importance which Congress attaches to this problem, two members have been added

to the subcommittee. Unfortunately, Mr. Lindley Beckworth, of Texas, is ill, but Mr. Peter F. Mack, Jr., of Illinois, will be here in a few minutes. We want everybody in this country, not only the people of New York and New Jersey, but the citizens all over the United States, to know that Congress is very much interested in this subject and we hope to exhaust it fully at this hearing, and at a later date.

I might also mention that Mr. Joseph P. O'Hara, of Minnesota, has been added as a member of the committee and he is also here.

Now, I want to ask one question, but if you feel that it is covered by what Mr. Tobin has to tell us, we will wait until after he gives his statement.

What I would like to know is whether the agreement or compact between the two States gives the port authority the power of location or relocation of any airport under its jurisdiction.

Mr. SLY. I think I would prefer to have Mr. Tobin tell you about that. I think that he will cover that in his statement.

Mr. KLEIN. Then I have no further questions.

Mr. WOLVERTON. Mr. Sly, in the statement that you have just given us, you have pointed out that the port authority, by reason of the legislation enacted by the two States, is the operating agency of this and other airports that come within its area of action.

May I ask you does the question of the operation of these airports involve and include the granting of concessions?

Mr. SLY. As I stated before, Mr. Wolverton, the entire sphere of the port authority is based on a self-sustaining basis. All our facilities are operated by the port authority and the revenue derived from the operation of those facilities, including the concessions, are within our authority and we have always so acted, and we depend on those revenues, including that from the concessions, to make ours a self-sustaining proposition.

Mr. WOLVERTON. Does that include the sale of gasoline to the airlines that operate out of the airports?

Mr. SLY. Yes.

Mr. WOLVERTON. Do I understand, then, that the gasoline that is used by the airlines that have their planes take off from Newark Airport, has been purchased from the Port of New York Authority?

Mr. GLASS. No.

Mr. KLEIN. The gentleman who has just spoken has not as yet been sworn.

Mr. WOLVERTON. You spoke about the rules and regulations that have been fixed by the CAA and the CAB with reference to operations of planes. The PAD, that is the Petroleum Administration for Defense, has fixed, by its order of October 19, 1951, the formula with respect to octane and the amount of lead that is to be used in the gasoline.

I am interested in knowing whether the New York Port Authority complies with that regulation.

Mr. SLY. That is a question that one of the other members will tell you about or give you the answer to.

Mr. WOLVERTON. What I have in mind is that the character of gas used enters materially into the question of the safe operation of airplanes, and it has come to my attention that there has been considerable opposition to the type of gasoline that has been fixed for use by order

of the PAD, in that it requires the use of a higher content of lead than was formerly the case and has decreased in the use of alkylate. This is germane to the safe operation of the airlines.

I want to know if the New York Port Authority has recognized that or whether it has accepted the order of October 19, 1951, by the PAD and uses the type of gasoline that body has fixed as the proper formula.

Mr. SLY. I am informed by our executive director that the gasoline sold at La Guardia, International, and Newark is sold by direct contract between the airlines and the suppliers. We supply the gas at Teterboro.

Mr. WOLVERTON. But whatever gasoline is used at La Guardia, International, and Newark Airports are the direct responsibility of the lines whose planes take off?

Mr. SLY. That is correct, sir.

Mr. WOLVERTON. You have nothing whatsoever to do with that gasoline?

Mr. SLY. That is correct.

Mr. WOLVERTON. Did you at any time sell any gasoline in addition to the gasoline you supply at Teterboro, to any of the airlines whose planes take off from LaGuardia, International, or Newark Airports?

Mr. SLY. No, sir, we have not.

Mr. WOLVERTON. But you do at Teterboro?

Mr. SLY. Yes; we do at Teterboro. The executive director tells me that this concession at Teterboro is handled by the Esso people.

Mr. WOLVERTON. How is the responsibility of that concession arrived at?

Mr. SLY. Chiefly by entering into an agreement with the port authority, like all our concessions.

Mr. WOLVERTON. Do you have any method of bidding for the concession or is it one that you choose on your own responsibility?

Mr. SLY. I am informed by the executive director that generally speaking we do not have bidding, but the concession is usually determined by the quality and the demand.

Mr. WOLVERTON. Did you enter into a contract with Esso?

Mr. SLY. Yes, sir.

Mr. WOLVERTON. Do you have a copy of that contract?

Mr. SLY. We can get one for you.

Mr. WOLVERTON. If the committee is willing, I would like to see a copy of the contract presented to the committee.

Mr. SLY. We will be glad to supply it.

Mr. WOLVERTON. Suppose you submit a copy and if we can we will put it into the record.

Mr. SLY. Of course, sir, that only applies to the airport at Teterboro.

Mr. WOLVERTON. I understand that under no circumstances do you supply gasoline to the La Guardia, Newark, or Idlewild Airports.

Mr. SLY. Correct.

Mr. WOLVERTON. At Teterboro, what if any effort is made on the part of the port authority to ascertain whether the gas delivered is of the proper quality?

Mr. SLY. Would you permit me, sir, to refer that question to Mr. Glass when he makes his statement?

Mr. WOLVERTON. The reason I mention this at the present time is that personally I see the importance of the type of gas used by the

planes in taking off and landing. The claim has been made that the gas that is provided under the order of October 19 last requires a higher degree of tetraethyl lead and a decrease in the quantity of alkylate and that the use of the former has a tendency to increase corrosion in the engine, spark plugs, governors, and valves and pipelines, including the dome section of the propellers. That is a matter that has a great deal to do with the safety of the plane in take-offs and landings. In the opinion of some, the use of tetraethyl lead in the quantity used to produce octane gas or the octane that is required has increased the jeopardy of the plane in landing and taking off.

Do you know whether the planes that took off from Newark Airport had the type of gas that was required under the order of October 19?

Mr. SLY. I wouldn't know that.

Mr. WOLVERTON. Do you know where these planes had been serviced for gasoline?

Mr. SLY. We would have no official knowledge of that, sir.

Mr. WOLVERTON. Now, Mr. Sly, what if any knowledge do you have with respect to the provisions that are contained in the order of October 19 which was issued by the Petroleum Administration for Defense?

Mr. SLY. I will have to ask Mr. Glass to testify to that. He is making notes of these technical questions and will probably be in a position to answer your questions.

Mr. WOLVERTON. I would like someone to give me some interpretation, if it is possible, of the purpose and effect of the provisions in the order of October 19 which states:

> No person shall be held liable for damages or penalties for any act or failure to act resulting directly or indirectly from his compliance with this order, or amendments thereto, so long as this order and its amendments shall remain in force, notwithstanding that this order, or any amendments thereto, or any part thereof, shall hereinafter be declared invalid by judicial or other competent authority.

I would like to know whether it has the effect of changing all the rules of liability for the loss of life or of injury or loss of property as it applies to these accidents that occurred in Elizabeth.

Mr. SLY. That is not within our jurisdiction, sir.

Mr. WOLVERTON. There would be no one in authority who would have any cognizance of the purpose and intent of that particular provision of the October 19 order?

Mr. SLY. Not officially, sir.

Mr. WOLVERTON. There was presented by our colleague, Mr. Clifford P. Case, a communication from the Chamber of Commerce of Eastern Union County that asked certain questions to be presented for answering at this hearing. I am not certain that the committee has that communication here today, as unfortunately our chairman was taken sick suddenly and has probably kept some of those communications, but I am informed that the two questions they are interested in is, first, what, if any, detailed publication of periodic reports is made by the Port of New York Authority as to its assets and earnings?

Mr. SLY. The executive chairman will cover that in his testimony in detail.

Mr. WOLVERTON. All right. The other question is what, if any, publication is given by the Port of New York Authority with respect to major new plans and programs of the Port of New York Authority?

Mr. SLY. That will be covered, too, by the executive director when he makes his report.

Mr. WOLVERTON. Then I will ask no further questions at this time, but I do wish to go into this gasoline question further and I intend to pursue that at a later point in the hearing.

Mr. KLEIN. Any other questions?

Mr. O'HARA. My understanding is that there was a compact or lease or agreement between the port authority and the city of Newark with reference to the operation of the airfield; is that correct?

Mr. SLY. That is correct, sir.

Mr. O'HARA. But there was no agreement, as I understand it, between the port authority and the city of Elizabeth; am I correct in that assumption?

Mr. SLY. That will be taken care of by the executive director's statement. However, that statement is not quite correct, but will be covered when he makes his report.

Mr. KLEIN. Before we proceed to the next witness, our colleague, Mr. Clifford P. Case, of New Jersey, is present, and since he is not a member of the committee, the committee has decided that if he cares to ask any questions, he may do so through the chairman of the committee and that applies to any other governmental, State or private group. If any of them would like to have something brought out for the record, they will have the opportunity to do so but the questions will be directed through the Chair. Do you have any questions that you want to ask, Mr. Case?

Mr. CASE. I prefer to wait until all three statements have been made by the gentleman from the port authority.

Mr. KLEIN. That will be all, Mr. Sly, unless you have anything further to add.

Mr. SLY. If you will permit, I will now call Mr. Tobin.

STATEMENT OF AUSTIN J. TOBIN, EXECUTIVE DIRECTOR, PORT OF NEW YORK AUTHORITY

Mr. KLEIN. Your name and address, please, for the reporter.

Mr. TOBIN. Austin J. Tobin, 13 Monroe Place, Brooklyn, N. Y.

Mr. KLEIN. You may proceed.

Mr. TOBIN. As executive director of the Port of New York Authority, I am responsible to the board of commissioners for the administration of the affairs of the port authority and the direction of its staff.

In accordance with Commissioner Sly's request, I shall try to review briefly for the committee the history and record of the request of the city of Newark for a port authority proposal for the future financing and development of Newark Airport, as well as outlining the background and record of Newark's acceptance of that proposal. I shall review the public hearings, the practically unanimous public support for the reconstruction and development of the city's airport. I shall also summarize the terms of the agreement, Congressman O'Hara, in line with your question, and the cooperation that we have received from the city of Newark and the city of Elizabeth in carrying out the airport agreement.

At the close of World War II, the city officials of Newark gave serious consideration to the financial problems they faced in carrying forward the reconstruction and modernization of both Newark Airport and the Newark seaport area. Both facilities had been the subject through the years of proper community pride, and had been hailed by city officials and leading citizens throughout the years as vital to the continued prosperity and welfare of the people of northern New Jersey.

Newark Airport at that time, and I am speaking of 1945, comprised 1,400 acres. The city had built a terminal and administration building and hangar facilities, and had laid out the three runways which are in existence today. These runways have been repaved and extended by the Air Force during its occupation of the airport throughout World War II.

In the 17 years of operation, from 1928 through 1944, the airport had cost the taxpayers of Newark an average annual loss of $415,000. The runways, as originally constructed by the city of Newark, were built upon filled marshland and had suffered considerable settlement. During the period when the Air Force had taken over the airport, from 1942 through 1945, large expenditures were made for extending these runways and taxi strips, but this work was planned on a war emergency basis, and when we were asked by the city to survey the situation, our engineers reached the conclusion that the present runways had a service life of very little more than 5 years, with a rating for continuous service only if they were limited to planes under 60,000 pounds gross weight.

It was evident, therefore, that if the city wished to maintain the status of Newark Airport as one of the country's major landing fields, it would be necessary to spend large sums for the complete reconstruction of the runway system.

To assist in formulating what eventually became the official position of the city of Newark with respect to this problem of reconstruction and future development of the city's airport, the city retained the planning and engineering firm of Harland Bartholomew & Associates, whose home then was St. Louis, to make a thorough study of Newark Airport and Port Newark.

In October 1945, that firm submitted to the Central Planning Board of the City of Newark a detailed study of Newark Airport and Port Newark.

The Bartholomew report was widely publicized. It emphasized the importance to the city of continuing the development of both their airport and their seaport, and the importance to the city of maintaining its position as an important center of air transportation.

I quote from that report as follows:

> Newark needs both an airport and a seaport. While some public subsidy may be justified, the Newark taxpayer should not be forced to carry the full financial burden. Newark's endeavor to create a great seaport and airport has been highly commendable and forward-looking. However, these operations have resulted in the creation of a great debt and a substantial increase in taxes. Seaport bonds aggregating $10,390,619.85 and airport bonds aggregating $7,598,467.60 have been issued to date. The financial difficulties have been further aggravated and the port has not been developed to its capacity because of the obstacles to good port management that are inherent under city department administration. To realize the best results from the seaport and airport development, it is essential that they be placed under an independent agency which could employ the

same sort of aggressive management practices as would be expected by a good concern.

Looking to the future, there is no question but that there is much need for a great seaport and airport at the locations which Newark has developed for these two facilities. Since the location and the traffic of both the seaport and airport are so completely integrated with the remainder of the New York metropolitan area, it is unwise for Newark to attempt to further develop these facilities by itself. Their greatest usefulness and maximum volume of traffic to be expected will be only attained through their coordination with other facilities in the New York metropolitan area. Only in this way will the seaport and airport reach their maximum usefulness and their greatest and most logical volume of traffic.

Newark is now carrying a substantial debt on both seaport and airport and—

the report continues—

it will be many years before this debt can be liquidated. It now represents about two and a half points on the tax rate for the seaport and about five points for the airport. New improvement and facilities are needed in the immediate future, which are estimated to cost approximately $4 million for the seaport and approximately $12 million for the airport. Before completing the ultimate development, an additional estimated $22 million will be required for the seaport and $8 million for the airport. Newark taxpayers should not be called upon to carry this additional load.

In considering the possibility of a metropolitan or State authority, we find already a well-established agency specifically created for these particular functions in the Port of New York Authority. This agency is peculiarly well-constituted to handle facilities of this type and has a large staff with long experience in all forms of transportation in the New York metropolitan area.

The report concluded:

Assuming that the Port of New York Authority would be interested in taking over these two great facilities, it is strongly recommended that this line of action be pursued to the fullest. Newark taxpayers would be relieved of the large additional capital expenditures that must soon be made at both the airport and the seaport.

Now, as I have noted, in 17 years of operation, from 1928 through 1944, the time of the report, the air terminal had cost the taxpayers of Newark an average of $415,000 per year. In 27 years of operation from 1918 through 1944, the marine terminal had cost the taxpayers of the city an average of $395,000 per year, representing net losses.

In effect, then, the port authority was about to be asked to what extent could the two States, through their joint agency, the port authority, relieve the people of Newark from this recurrent annual deficit of over $800,000; and could it, in addition, relieve the people of Newark of the future burden of developing, rehabilitating and constructing the airport and seaport, a burden which the city's consultant estimated at $46 million and which we later estimated at over $76 million.

The city officials had taken up the Bartholomew report with us and asked that we make a study of the Newark airport and seaport. On December 21, 1945, I wrote the city officials as follows:

The commissioners believe that it would be improper for the port authority to embark upon an intensive study of the possibility of taking over any project owned by any municipality unless such a study was requested by the governing board of the municipality. Our commissioners are thoroughly in accord with the views of your consulting engineers as to the tremendous value of the seaport and airport, not only to the city of Newark,, but to the whole port district and to the two States. It is the statutory duty of the port authority, as the joint agency of the States of New Jersey and New York, to render advice and assistance with reference to municipal port and harbor improvements to all municipal officials in the port district. As you are aware, we have, over many years past, assisted in the development of Port Newark and Newark Airport. Pursuant to

their duties under the port compact of 1921 with regard to the future planning and development of the port, the commissioners have therefore directed me to advise you that they are willing to undertake such a study and to make the expenditures necessary, provided they receive an official request to do so from the Board of Commissioners of the city of Newark.

Thereafter, the city of Newark forwarded a resolution to the board of commissioners of the port authority, unanimously adopted on December 27, 1945, by the commissioners of the city of Newark, including Commissioner Ellenstein.

The resolution, which I will offer as an exhibit, requested the port authority, and I quote—

to undertake a thorough study of all the matters with relation to Port Newark and Newark Airport, to the end that said Port of New York Authority may make to the city of Newark a proposal concerning the possibility of its undertaking the management and administration of the said Port Newark and Newark Airport, so that the City Commissioners of the City of Newark may consider such proposal together with alternative forms of administration of said Port Newark and Newark Airport, in order to arrive at a determination concerning the most feasible, practicable, and economic manner of administration thereof in the interest of the citizens and taxpayers of the city of Newark.

Mr. KLEIN. The resolution of the governing body of the city of Newark will be received in evidence and marked exhibit PA–1.

(The item referred to was thereupon marked "Exhibit PA–1" and made a part of the committee files.)

Mr. TOBIN. The port authority acquiesced in this official request and began a thorough study of the whole problem of continuing the development and reconstruction of Newark Airport and the seaport, including the very difficult problem of financing that development. We made a detailed investigation of the past history of the two facilities and studied the multitude of facts and plans, traffic figures, cost studies, and other data that were necessary to the decision of whether a proposal could be made at all; that is to say, whether we could go forward with the development of the airport and seaport on a self-supporting basis, which was the only way on which the port authority could undertake it, and, if so, what general plan of development could be submitted.

Parenthetically, I should note that at approximately the same time the port authority undertook a similar study at the request of the city of New York relative to possible port-authority operation and development of the New York air terminals, which eventually resulted in a long-term lease of both La Guardia and New York International Airports, dated April 17, 1947.

The public advantages of coordinated management and development of both the Newark and New York City air terminals in the interests of the whole metropolitan region of northern New Jersey and New York was a major point of the port authority's usefulness in the picture. Such coordinated management of the airports of the metropolitan area could bring about the integration of runway construction and the resulting air-traffic patterns in the interest of safety, and it would put an end to the ruinous airport competition between Newark and New York City, in which Mayor La Guardia and Commissioner Ellenstein had been the respective protagonists.

On July 31, 1946, the port authority presented to the city of Newark the results of its study in the form of a proposal for the purchase and operation of Newark Airport, and I will submit that report as an exhibit for the record.

Mr. KLEIN. The report entitled "Port Authority Study: Development of Newark Airport and Seaport," dated July 30, 1946, will be received in evidence and marked "Exhibit PA–2."

(The item referred to was marked "Exhibit PA–2" and made a part of the committee files.)

Mr. KLEIN. Up to the point where you indicate that you studied the status of the Newark and New York airfields, what did you have under your jurisdiction, or were you with the port authority at that time?

Mr. TOBIN. At that time the port authority was operating the grain terminal at the foot of Columbia Street in Brooklyn, the docks at the Gowanus, the George Washington Bridge, the Lincoln tunnel, the Holland tunnel, the Outer Bridge, the union motortruck terminal on the West Side of Manhattan——

Mr. KLEIN. Nothing to do with the Newark Airport?

Mr. TOBIN. No, except that we were directed by the State to appear from time to time before committees of the legislature concerning respective legislation governing the airfield, and we had appeared from time to time at the request of the Civil Aeronautics Board; and also, I should say, many years before, about 10 years before, there had been a rather primitive study or primitive studies made by the port authority of the airport problem—that is, back in the early days of airport development, back before La Guardia was developed in 1939—but in 1932 and 1933 there were some airport studies made in general terms on the whole problem, which, as I indicated, were rather primitive studies. Those studies did not indicate that the port authority was capable of operating the airports. As a matter of fact, I think we said something to that effect following these primitive studies.

Mr. KLEIN. You may proceed.

Mr. TOBIN. As I was stating, on July 31, 1946, the port authority presented to the city of Newark the results of its study in the form of a proposal for the purchase and operation of Newark Airport. Basically, the results of the port-authority study were in accord with the general conclusions and recommendations reached in the prior Bartholomew report.

The port-authority survey included:

> A comprehensive evaluation of the entire problem, showing—
> (*a*) The need for marine and air terminals at Newark;
> (*b*) The extent to which their continuance and development will require rehabilitation and new construction;
> (*c*) The estimated cost of such improvements;
> (*d*) The probable revenues and expenses, including debt service, for such improved and expanded facilities; and
> (*e*) The feasibility of the Port of New York Authority's taking over the facilities as they stand today and carrying forward the improvements and expansion considered necessary to meet the needs of trade and commerce.

At that time—that is, in 1946, as I have noted—the service life of then-existing runways was limited to approximately 5 years of use. The port authority's study concluded that, if the city decided a major air terminal at Newark was to be continued, it involved the ultimate construction of what amounted to virtually a new airport with an extensive system of dual runways, permitting simultaneous two-way operations, varying in length from approximately 6,400 to 9,000 feet. Such expansion, it was indicated in that 1946 report, required the

acquisition of approximately 860 acres in the city of Elizabeth, adjoining the airport and south of the Essex County line. The proposal also contemplated the construction and provision of the necessary passenger terminals, hangars, and other facilities.

An analysis was included of future aircraft movements. It supported the conclusion that, if the Newark city officials wished the city to maintain its place as a center of air commerce, a major construction program and a heavy expenditure would be required. It agreed with the conclusion of the Bartholomew report that a major air terminal was needed for the service of the air passengers and cargo of northern New Jersey and to maintain the important position of New Jersey in the transportation picture of the air age.

A critical problem in the development of Newark Airport was the character of the terrain upon which it was built. The original runways constructed by the city were built upon filled marshland which had not been stabilized against the soft, sinking meadowmat underlying them. These runways had been subject to severe settlement. The ultimate runways required for the kind of airport development the city commissioners were considering would need extensive subsoil treatment and consolidation so that the new runways would have solid footing.

We advised them that such a new airport would involve a capital cost of approximately $50 million.

You gentlemen may have noted that I said the port authority's report referred to the airport facilities "as they stand today"; that is to say, as of the time of the 1946 report. The records show that the airport comprised 1,300 acres at the time the city of Newark turned it over to the Air Force in December 1941. In March 1948, when the port authority finally went into possession under the airport agreement, the city then had 1,400 acres devoted to airport purposes. Under the agreement, the port authority was obligated to increase the acreage to 2,300, and that was finally accomplished in 1951.

The widest public discussion and the intensive consideration of the municipal authorities, civic groups, and individual citizens were given to the port-authority proposal to the Commissioners of the City of Newark. The official presentation of the proposal to the commissioners of the city was attended not only by the commissioners of the port authority but by the representatives of municipal and civic groups of both Newark and Elizabeth. The hearing room was crowded. In the open meeting, the mayor of the city of Newark said [reading]:

> This is a serious and an important decision that the board of commissioners is being called upon to make, and I believe that copies of this proposal should be made available to our planning board, our complete Citizens Committee on Planning, our business interests, our veterans, labor, civic, fraternal, and social groups, to any and all groups or any individual citizen who may desire a copy of this report, and I think a reasonable period of time should be given to them to study this proposal—

said the mayor—

> then this board of commissioners can set a date for final action by the Board of Commissioners of Newark.

Then he said:

> I understand that the Port of New York Authority has had several thousand copies of this proposal printed. They have been made available to anyone

who desires a copy. I also understand that they will be glad to appear before any group to explain the proposal as much in detail as is possible.

In submitting the proposal, Commissioner Pope, speaking for the port authority, said in part:

Coming before you this morning with this plan, we are unanimous. We have one objective. We have one point of view. So that, although the commissioners of the Port of New York Authority are appointed by the governors of these neighboring States, I remind you that they have, and always have had, only one responsibility, and that is the development of this port area for the benefit of the people who lie within it. As you have suggested, Mr. Mayor, some months have passed since you asked us to study the question. We have studied it with great care. We have had the best advice with respect to traffic, with respect to the future, with respect to costs, with respect to all of the problems that enter into such a development. We believe the plan that we are putting before you is economically sound and offers the utmost in development that is reasonably possible to make within the next few years if you will take full advantage of the opportunity that this presents for this area.

In the period following this submission—that is, the submission of this proposal to the city of Newark, to the date of the execution of the lease over a year later, October 22, 1947—all aspects of this proposal were submitted to searching public scrutiny, both offical and unoffical.

To cite only several examples, on August 1 it was presented to the Central Planning Board of Newark; on August 2 to the Ironbound Manufacturers Association of Newark and the board of directors of the Broad Street and Merchants Association of Newark; on August 5th to the Newark Chamber of Commerce, and on August 5th also, in the evening, to the Elizabeth City Council.

At that time the major considerations were the financial proposals. Commissioner Ellenstein, who appeared before this committee, argued that the proposal should be rejected on the grounds that it did not include a high enough monetary return to the city of Newark. By resolution of September 17, 1946, therefore, the Board of Commissioners of the City of Newark accordingly rejected the port authority's proposal for the purchase of these terminal facilities.

A counteroffer involving a substantially greater purchase price was put forward by the city, thereafter reviewed by the port-authority commissioners, and rejected by them on September 26, 1936, as economically impractical.

A negotiating committee was then named to explore all possible avenues of financial compromise. Commissioner Ellenstein was one of the representatives of the city of Newark on this committee. Thus, in addition to the original port-authority proposal of July 31, 1946, there were three formal communications, dated September 9, 1946, January 7, 1947, and May 21, 1947, respectively, from the port authority to the city of Newark, outlining alternative proposals for discussion.

On June 13, 1947, I wrote a letter to Commissioner Ellenstein, the introductory paragraph of which will indicate to the committee the extent and thoroughness of the discussions of these airport plans between the Commissioners of the City of Newark and the commissioners of the port authority.

That paragraph is as follows:

MY DEAR COMMISSIONER ELLENSTEIN: At the meeting of the negotiating committee on Tuesday, June 3, 1947, you presented 18 questions with respect to the port authority's proposal for the development and operation of the Newark marine and air terminals. These were answered orally during the course of that meet-

ing. As you requested, however, I am submitting on behalf of our special committee, Commissioners Howard R. Cruse and Bayard F. Pope, the following written replies.

Instead of reading the entire letter, the full text of this letter is submitted as an exhibit.

Mr. KLEIN. The letter from the port authority to Commissioner Ellenstein will be received in evidence and marked "Exhibit PA–2A."

(The item referred to was marked "Exhibit PA–2A" and made a part of the committee files.)

Mr. TOBIN. So, too, at another one of the many meetings between the commissioners of the city and the commissioners of the port authority on July 9, 1947, at which were present Commissioners Ellenstein, Villani, Keenan, and Brady of the city of Newark, and Commissioners Byrne, Pope, Cruse, Moran, Abell, and Lowe of the port authority, the following very interesting and pertinent questions and answers appear in the record. It was submitted in writing by Commissioner Ellenstein and his associates, and I quote:

Will the port authority agree that all plane take-off paths shall be south in the direction of Elizabeth at all times?

And the port authority's answer was:

The port authority has no authority over aircraft in flight, and obviously cannot agree to any restriction on the traffic pattern serving the airport. However, it is agreeable to using its best efforts at all times to minimize any annoyance caused to residents of the surrounding area by aircraft in flight.

Typical points of view during the course of this public discussion which was published by the Newark Civic Association and others will give the committee a further picture of the public debate.

For example, on October 4, 1946, the Broad Street and Merchants Association of Newark, N. J., issued a special bulletin in which it said:

It is superfluous to reiterate that this proposal is far too important for the city of Newark to drop without the Commissioners showing a willingness to negotiate face-to-face with the members of the port atuhority. It is gratifying to note that three city commissioners favor a conference.

The same association, on August 12, 1946, had written to the Board of Commissioners of the City of Newark, and I quote:

Newark is on the direct line of flight to all the important centers of this country and the world. The airliners will go over Newark, anyway. It would be criminally short-sighted to keep them from making Newark a main center by failing to provide the facilities needed. Only a body with the experience, the same standing and the fund-raising ability of the port authority can handle the situation.

The report of the Port Newark subcommittee of the citizens advisory planning board of the city of Newark, dated August 15, 1946—and I offer that as an exhibit—in part emphasized:

We believe that Newark will remain a busy and prosperous industrial city only so long as the transportation value of the city is supreme in the area. A well-rounded transportation program must include the air and sea, as well as rail and highway. Both our airport and seaport are necessary to a prosperous Newark, and because the location and traffic of these facilities are so completely integrated with the Newark-New York metropolitan area, it becomes of vital importance that they be under some regional control, so that the maximum of coordination with all other facilities in the area can be attained.

Mr. KLEIN. The report of the Port Newark subcommittee of the citizens advisory committee to the central planning board of the city

of Newark, dated August 15, 1946, will be received in evidence and marked as "Exhibit PA–3."

(The item referred to was marked "Exhibit PA–3" and made a part of the committee files.)

Mr. TOBIN. A resolution was adopted recommending:

That the offer submitted to the city of Newark by the Port of New York Authority be accepted in full.

Another point of view was that of the New Jersey Industrial Traffic League, which, on October 10, 1946, wrote to the Newark city commissioners stating that it was their considered opinion that—

Present conditions in the airport, and even more the seaport, seriously merit expedited negotiations with the port authority, with an eye to almost immediate action so as to afford comparatively prompt improvement of the more aggravated physical conditions. It is our thought, as transportation men, that perhaps the city commissioners, in their commendable efforts to secure the most favorable terms for the city, are forgetting, or at least overlooking, the fundamental purpose of the two facilities involved, namely, to provide adequate transportation services for the present and future needs of the area served.

The position of the Chamber of Commerce of the City of Newark was expressed in its letter of August 16, 1946, to the commissioners of the city. It strongly recommended the adoption of the port authority's proposal. I offer that letter as an exhibit.

Mr. KLEIN. The chamber of commerce letter to the city of Newark dated August 16, 1946, will be received in evidence and marked "Exhibit PA–4."

(The item referred to was marked "Exhibit PA–4" and made a part of the committee files.)

Mr. TOBIN. The magnitude of the problem presented to the city of Newark, i. e., whether or not to have a major air terminal within its city limits operated and developed by the port authority, coupled with the protracted period of public debate and consideration of the conflicting viewpoints, made the lease proposed by the port authority the center of controversy.

Interestingly enough, this controversy concerned itself with whether or not the city would obtain from the port authority a satisfactory financial arrangement. The opposition, led by Commissioner Ellenstein, circulated and published numerous and extensive written statements highly critical of the proposal. The basic ground of this opposition was the contention that the port authority's guaranteed rental of $100,000 per year was unsatisfactory, that the lease provisions for the payment to Newark of 75 percent of the annual revenue after payment of operating expenses and debt service charge was illusory, and that the port authority proposal did not assume payment of the debt previously incurred by the city for the construction of the Newark marine and air terminals. Both of these were the principal grounds of opposition.

Commissioner Ellenstein circulated petitions which, had they been effective, would have required a municipal referendum on proposed ordinances, the effect of which would have been to prevent the sale or lease of the Newark terminal properties for less than a guaranteed minimal annual rental of $750,000.

Finally, however, the negotiating committee arrived at an acceptable leasing arrangement, the essential basis of which was completely worked out by July 9, 1947.

I should like to say something at this time about the public support of the development of Newark Airport and Seaport by the port authority. So voluminous was the press in unanimously urging the port authority development of Newark Airport and Seaport, that some of the clippings from October 1945 through February 1947 literally fill a book. Without taking the time of this committee, I will introduce in the record a collection of this unanimous opinion of the press advocating the port authority's development of the Newark Airport and Seaport. The clippings are from practically every newspaper in an area within the environs of the airport. To mention but a few: Newark Evening News, Newark Star-Ledger, Newark Sunday Call, Newark Sunday News, Newark Sunday Star-Ledger, New York Times, New York Herald-Tribune, Hudson Dispatch, Elizabeth Daily Journal, Jersey Observer, the Jersey Journal, Atlantic City Press, Trenton Evening Times, Bergen Evening Record, the Nutley Sun and Herald-News.

This unanimous public support of the proposal continued right up to the signing of the agreement in October 1947.

I offer the volume of clippings as an exhibit.

Mr. KLEIN. The clippings, which are bound in two parts, will be received in evidence and marked "Exhibit PA–5."

(The items referred to were marked "Exhibit PA–5" and made a part of the committee files.)

Mr. TOBIN. So, too, the plans and activities of the port authority were acclaimed by the press after the signing of the agreement in October 1947, which agreement I offer as an exhibit.

Mr. KLEIN. The agreement will be received in evidence and marked "Exhibit PA–6."

(The item referrd to was markd "Exhibit PA–6 and made a part of the committee files.)

Mr. TOBIN. The agreement with respect to the Newark marine and air terminals of October 22, 1947, was thus not adopted by the city commission on the basis of either private or hurried action. The terms and details of this contract were worked and reworked in the period between the submission of the original port authority proposal on July 31, 1946, and the final adoption of the negotiated lease on October 22, 1947.

To ascertain as fully as possible the views of its electorate, the Newark city commissioners held public hearings on October 15 and 16, 1947, with respect to the merits of the port authority proposal. The opponents were allowed the entire day of October 15, 1947, to present their views, while the proponents were allowed the entire day of October 16, 1947. Some 31 persons appeared in opposition. I have a record of those who appeared in opposition, which I would like to offer as an exhibit.

Mr. KLEIN. The list of opponents will be received in evidence and marked "Exhibit PA–7."

(The item referred to was marked "Exhibit PA–7" and made a part of the committee files.)

Mr. TOBIN. Of those, 12 were individual taxpayers. Sixteen others in attendance opposed, but did not desire to be heard.

On the other hand, a very large list of proponents appeared at the hearings, numbering over 300, most of whom represented large groups

of every typical segment of the community. I have a list of the proponents and offer it as an exhibit.

Mr. KLEIN. The list of proponents will be received in evidence and marked exhibit PA–8.

(The item referred to was marked "Exhibit PA–8" and made a part of the committee files.)

Mr. TOBIN. Some of those typical proponents of the airport-development plan included: Regional Plan Association, by C. Earl Morrow; Newark Chamber of Commerce by Charles H. Watts, president, and William J. Brennan, Jr.; New Jersey Traffic League by Walter J. Horrer, president; Merck & Co., Rahway, N. J., by Harry F. Fuiter, traffic manager; New Jersey Merchandise Warehousemen's Association, Inc., by Charles J. Fagg; Mutual Benefit Life Insurance Co., by Henry Petty; Real Estate Board of Newark, by Joel Schlesinger; port Newark subcommittee, Citizens Advisory Committee to the Planning Board, by E. W. Wollmuth; New Jersey Historical Society—Women's Branch, by Elizabeth C. Carter; Broad Street and Merchants Association of Newark, by Ralph E. Lum.

For the consideration of this committee, if it so desires, we have available the stenographic transcript of those public hearings, of which we only have one copy, but they are available.

Commissioner Sly has referred to the bi-State statute, which sets the policy of the two States with respect to airport development in this metropolitan area, and under which the port authority was specifically authorized to carry forward the further development of Newark Airport. This legislation supplemented the port compact of 1921, covered by chapter 43, Laws of New Jersey 1947, as amended, and chapter 802, Laws of New York 1947, as amended.

The legislation became effective April 11, 1947, having been passed by the New Jersey Senate unanimously, and by a vote of 57 to 1 in the assembly. In New York it passed both the senate and the assembly unanimously.

This bi-State legislation declared:

> The States of New Jersey and New York declare and agree that each air terminal within the port of New York district serves the entire district, and that the problem of furnishing proper and adequate air-terminal facilities within the district is a regional and interstate problem, and that it is and shall be the policy of the two States to encourage the integration of such air terminals as far as practicable in a unified system.

The bi-State agreement—a statutory agreement—then continues:

> Accordingly, in furtherance of said policy and in partial effectuation of the comprehensive plan heretofore adopted by the two States for the development of terminal and transportation facilities in the port of New York district, the States of New Jersey and New York agree that the Port of New York Authority shall be authorized to effectuate, establish, acquire, construct, rehabilitate, improve, maintain, and operate air terminals, as hereinafter defined, within the port of New York district, and the two said States further agree that all cities and other States and local agencies shall be and they hereby are authorized to cooperate with the port authority in the development of air terminals, as hereinafter provided.

I might point out at this time that there followed the prohibition against the port authority's acquisition of air or other terminal property owned or operated by a municipality without the consent of such municipality, saying:

> Nothing herein contained shall be construed to authorize the port authority to acquire any air terminal owned or operated by any city or other municipality

or public authority, or any other property now or hereafter vested in or held by any city or other municipality or public authority, without the authority or consent of such city or other municipality.

In other words, the port authority could not have leased Newark Airport without the consent of the city of Newark, nor could it have acquired any city-owned property in Elizabeth—which was one of our obligations under the agreement—without the consent of the city of Elizabeth. The two States declared in section 4 that:

The construction, rehabilitation, improvement of air terminals by the port authority is and will be in all respects for the benefit of the people of the States of New York and New Jersey, for the increase of their commerce and prosperity, and for the improvement of their health and living conditions and the port authority shall be regarded as performing an essential governmental function in undertaking the improvement, maintenance, or operation thereof.

Section 8 of the airport legislation provides:

Every municipality in the port of New York district is authorized and empowered to consent to the use by the port authority of any air terminal owned by such municipality or of any real or personal property owned by such municipality and necessary, convenient or desirable in the opinion of the port authority for air-terminal purposes.

The bi-State legislation then refers expressly to the power of the port authority to acquire privately owned real property for—

making additions, extensions, and improvements—

to Newark Airport, including, says the statute—

additions, extensions and improvements thereto located in the city of Elizabeth.

It is interesting to note that this same provision of the statute makes provision for—

the removal of actual or potential hazards to air navigation within 3 miles of the runways at Newark Airport as such runways may now or hereafter exist.

Now, the resolution of the Board of Commissioners of the City of Newark, approving the agreement with the port authority, was voted for by Mayor Vincent J. Murphy, Commissioner John B. Keenan, and Commissioner, now Mayor, Ralph A. Villani. It was opposed by Commissioner Ellenstein and Commissioner John A. Brady, the latter of whom is no longer a member of the board.

The majority took the step of outlining their views to the citizens of Newark in a pamphlet which they issued on October 10, 1947, and which was published in the Newark newspapers.

In this pamphlet, the majority of the city commission emphasized the necessity and advantages of going forward with the development of Newark Airport and Seaport, and of the port authority as the agent to carry the financing of that development. They pointed out the obvious attraction of developing the airport without further cost to the city.

Among other things, Commissioner Villani and his associates said:

It would be clear that the aim of our city is to develop these utilities in such a way as to increase the general business of the city's industries, provide the greatest amount of employment for our residents, and obtain the highest financial return that can possibly be secured. The improvement of the ports will benefit immensely the general industrial status of the city and thus create greater opportunities for employment for our citizens. The realization of these aims is of extreme importance, not only to the city government, but to all our citizens.

The pamphlet continued:

If we seek to maintain the seaport and airport at their present degree of development and do not expend large sums of money for their full development, then they will become obsolete in a period of 10 years. Then, too, the airport will no longer be usable for commercial flying. Thus, our tremendous investment of the past will depreciate and we will have on our hands a large area of meadowland unsuitable for industrial development as well as for commercial flying. None of us want to contemplate such a possibility.

Now, then, on October 22, 1947, the city of Newark and the port authority signed the agreement with respect to the Newark marine and air terminals and I offer that as an exhibit.

Mr. KLEIN. The agreement signed October 22, 1947, will be received in evidence and marked "Exhibit PA–9."

(The item referred to was marked "Exhibit PA–9" and made a part of the committee files.)

Mr. TOBIN. The agreement reiterates the policy which the two States themselves had agreed to in the airport statute which have been heretofore reviewed.

The city and port authority are agreed that the improvement, development, operation, and maintenance of the Newark marine and air terminals by the port authority and at its expense, will be in the public interest.

And it goes on to say:

New Jersey and New York have declared it to be their policy to encourage the integration of their terminals within the port of New York district so far as practicable in a unified system, and in furtherance of said policy, have authorized the port authority to improve, develop, operate, and maintain air terminals and have authorized and empowered cities and other municipalities in the port of New York district to cooperate with the port authority in the development of their terminals and to consent to the use by the port authority of any air terminals owned by them and of any real and personal property owned by them.

The Newark agreement then recites the passage of the resolutions of the Board of Commissioners of the city of Newark, and I offer that resolution, or a copy of that resolution in evidence, and also the resolution of the Board of Commissioners of the Port of New York Authority, dated October 22, 1947, authorizing the execution and delivery of the agreement, and I offer a copy of that in evidence and ask that it be marked as an exhibit.

Mr. KLEIN. The Newark Board of Commissioners' resolution dated October 22, 1947, will be received in evidence and marked "Exhibit PA–10."

The Port Authority Board of Commissioners' resolution, dated October 22, 1947, will be received in evidence and marked "Exhibit PA–11."

(The items referred to were marked "Exhibits PA–10 and PA–11," respectively, and made a part of the committee files.)

Mr. TOBIN. I will mention only a few important highlights of that basic agreement. It provides for a lease of Newark Airport and seaport as it then existed—about 1,400 acres—and—

any other lands, buildings, structures or improvements in the terminal area in or to which the city now has or hereafter acquires any rights.

The term of the lease is stated to be 50 years, or the date when the bonds to be issued by the port authority for the financing of its obligations under the agreement expire, whichever is earlier. At the end of

the term, the demised premises are to be returned to the city of Newark free and clear.

The lease was not to become effective—

unless the city has secured from the United States a surrender of a lease between the city and the United States of a substantial portion of the terminal area.

The city of Newark, by resolution dated March 10, 1948, which I will offer as an exhibit, was authorized and proceeded to obtain such a surrender from the United States Government. It is interesting to note that Commissioner Ellenstein supported this resolution, which recites that such action was necessary—

in order to make effective the lease between the city of Newark and the Port of New York Authority.

Mr. KLEIN. The resolution of the city of Newark dated March 10, 1948, will be received in evidence and marked "Exhibit PA–12."

(The item referred to was marked "Exhibit PA–12" and made a part of the committee files.)

Mr. TOBIN. By the terms—the provisions in the Newark agreement for rent provide for an annual payment to the city of Newark of a minimum of $100,000 a year for 9 years, and $128,000 a year thereafter, or in the alternative, 75 percent of the net revenue, pursuant to a stated formula in the agreement, for its computation. By the terms of the agreement, the Port of New York Authority obligated itself to the city of Newark to provide, from the proceeds of the sale of its bonds or otherwise, such amount as might be necessary—

to effectuate, rehabilitate, expand, improve, and develop the Newark marine and air terminals, up to the sum of $70.5 million.

Furthermore, and I quote from the agreement again—

Within 7 years from the effective date,

that is, by not later than March 22, 1955, the port authority is required to—

expend a minimum of $50 million

for the following purposes—and again I quote from the agreement:

(*a*) Expand the air terminal area southward through the acquisition of an additional area of approximately 800 acres, more or less, across the city line in the city of Elizabeth; (*b*) construct a new open-parallel dual runway system—or other appropriate runway system—for use by transport planes of from 125,000 to 150,000 pounds gross weight, having runways of from 6,400 to 9,000 feet, approximately, in length, and an approximate peak-hour traffic capacity of 120 plane movements; (*c*) construct a new and adequate loading arcade and passenger terminal building in the center of the runway pattern or other appropriate site; (*d*) provide adequate additional hangars, or space for the construction thereof by the air carriers; (*e*) provide other appropriate and needed facilities.

The agreement also covers quite extensively the rehabilitation and development of the Newark seaport, which are not immediately pertinent to this inquiry.

The agreement provides that the port authority must keep separate books and accounts covering the financing, construction, and operation of the airport which are open at all times to the inspection of the city's director of revenue and finance, an office which is held at this time by Commissioner Ellenstein. Actually, the commissioner has exercised the city's right under this provision, and retained the auditing firm of Samuel Klein & Co., whose representatives have each year made de-

tailed audits of our accounts with respect to the airport and Port Newark. I think, Congressman Wolverton, that you are especially interested in that, from your questions.

We are required to make an annual report to the city. We must promptly transfer title to any property we acquire for airport purposes within the city limits—that is, to the city of Newark. The agreement specifically provides that for purposes of inspection, the officials and employees of the city of Newark shall at all times have the right of free access to all portions of the demised premises.

In the light of all of the foregoing, it is somewhat, then, surprising to read that at your last hearing, in response to a question by Congressman Carlyle as to the progress of construction at the airport, Commissioner Ellenstein replied:

> That would be a military secret with the port authority, a separate monarchy of its own.

Under the terms of the agreement, the port authority takes over the maintenance and repair of all streets in the airport and seaport areas, the collection of garbage and refuse, the removal of snow and ice from the airport and seaport areas, and agrees to provide all police for the patrolling, guarding, traffic control, and firemen for aircraft crash and rescue work.

The city insisted that the port authority must agree "that the air terminal shall be known as Newark Airport." This is interesting because at that time in our discussions with the officials of the city of Elizabeth, they were urging that the new and enlarged airport should be called the Elizabeth Airport.

By sections 3 and 4 of the agreement, the term of the lease was not to commence until 30 days after the city of Newark had secured from the United States a surrender of the lease of a substantial portion of the terminal area.

I have referred to the resolution of the city commissioners, including Commissioner Ellenstein, which provided that the effective date of the port authority agreement was to be the date of the surrender of that lease. The resolution said that it was desirable and in the public interest to have the lease take effect promptly.

The city of Newark secured such a surrender from the Government of the United States on March 22, 1948, and the port authority agreement therefore became operative as of that date.

The city seemed at that time to regard the agreement with complete satisfaction. In the Newark Municipal Yearbook of 1947–48, published by the commissioners of the city, including Commissioner Ellenstein and Mayor Villani, we find the following fine tribute to Newark Airport, and I quote:

> A dream that has existed in the minds of the leaders for hundreds of years.

It goes on to say—

> With the leasing of the port facilities to the Port of New York Authority for a period of 50 years, Newark is about to realize a dream that has existed in the minds of its leaders for hundreds of years. Those who founded the city in 1666 foresaw the possibilities of creating a valuable asset out of the great salt meadows bordering their town. In 1927—

says the city commission's report—

> the Hoover fact-finding committee, which was created to foster the establishment of airports in the country, selected the Newark port area as the site of

a metropolitan airfield. The city spent millions in constructing the field and terminal buildings, hangars, and airstrips. Other improvements were made by the Federal Government on the 1,400-acre field. Newark then became the air-mail terminal in the East, and the airport was then regarded as the busiest in the world.

At the end of World War II, the city and the United States Government had, over a period of two decades, invested more than $70 million on development and improvement at the two ports. Port development recommended by the central planning board in 1946 called for an outlay of approximately $30 million. The board expressed the opinion that the taxpayers of the city should not be asked to assume this burden and recommended to the Newark City Commission that the Port of New York Authority be requested to take over the ports. The latter body was then asked by the city commission to make a survey and present an offer to the city.

The port authority proposes to rebuild the entire Newark Airport, based upon a dual-runway system, with an approximate peak-hour capacity of 120 planes. The authority's proposal includes the construction of six runways, ranging from 6,400 to 9,000 feet in length; the development of a 76-acre terminal area containing the most modern airport structures. Five hundred and forty acres will be available for new hangars, cargo transports and other such facilities, and to the present 1,400 acres will be added 800, south of the port.

The beginnings of Newark Airport were described by Commissioner Ellenstein, then mayor of Newark, before a subcommittee of the Committee on Commerce of the United States Senate in 1939. Mayor Ellenstein had sponsored an inquiry of the 1939 decision of the Civil Aeronautics Authority designating LaGuardia Airport as an additional terminal to Newark for the New York metropolitan area. His remarks at that time were as follows:

> In 1927 the Honorable Herbert Hoover, who was then Secretary of Commerce, appointed a committee of 24. On that committee there were four New Jersey members. That committee made a survey of 72 sites in the metropolitan area in an endeavor to determine which locations would be the best suited geographically to serve not only the metropolitan area but the entire country.
>
> The committee unanimously reported that the region on Newark Bay, and particularly the location of the present Newark Metropolitan Airport was best suited to serve the country.

In 1934, the city of New York sought to establish its own airport to compete with the Newark Airport. The New York City Airport, first referred to as the North Beach Airport, and now known as LaGuardia Airport, was constructed at a huge expenditure of New York City funds and WPA funds. The champion of Newark Airport's right to maintain its status as the major air terminal of this metropolitan area was Meyer C. Ellenstein. In his fight to retain and develop that position of airport leadership for Newark, he repeatedly stressed the advantages of safety, convenience to New York and the northern New Jersey industrial region and the city's willingness to expand the airport as required by the technological developments of aircraft.

On November 21, 1934, we find Mayor Ellenstein writing New Jersey civic groups to marshal opposition to New York in order to retain Newark Airport as the sole air terminus for handling mail in the New York region.

I offer Mayor Ellenstein's letter of November 21, 1934, as an exhibit.

Mr. KLEIN. Mayor Ellenstein's letter will be received in evidence and marked "Exhibit PA–13."

(The item referred to was marked "Exhibit PA–13" and made a part of the committee files.)

Mr. TOBIN. In that letter he stated:

In order to successfully combat these efforts, it is imperative that those of us who are concerned with the future of Newark's airport recruit every resource at our command. I am accordingly asking you to enlist your best services in the interest of Newark Airport, and respectfully request that you protest direct to Postmaster General James A. Farley, at Washington, D. C., against these threatened changes.

On April 30, 1935, Mayor Ellenstein wrote interested civic groups soliciting the services of prominent Newark citizens to be members of the Mayor's Airport Committee, stating in part:

The campaign against the Newark Airport by New York officialdom recently has increased in vigor. For that reason, it has become urgently imperative that the persistent and insidious efforts now being made to challenge Newark's claim to supremacy in airport facilities be combated with renewed energy.

In 1935, a hearing was held by the United States Post Office Department to determine whether a New York City airport should be designated as a coterminus with Newark for the handling of air mail to and from the New York metropolitan region. On June 20, 1935, the city of Newark, over the signature of Mayor Ellenstein, submitted a brief in support of the retention of Newark Airport as the sole eastern New York mail terminal, in which the following statements were made with respect to the safety, convenience, and desirability of Newark Airport:

Its purpose—

and he was referring to the brief—

is to establish beyond any question of controversion the advantages the Newark Metropolitan Airport holds over Floyd Bennett Field, as the eastern mail mail terminal, by reason of accessibility, facility, safety, and economy in operation. Confirmed in the opinion that future service to commercial aviation could best be performed at a properly equipped airport as near to the main arteries of industry and commerce and as close to the very heart of the metropolitan area as practicable, the officials of the city of Newark authorized huge expenditures in the development of the Newark Metropolitan Airport. For further contingent purposes there is available, in addition to the 420 acres allocated for airport development, more than 500 adjacent acres in municipal holdings that can be utilized for further airport expansion.

The brief goes on to say:

But no excuse that is consistent with sound public policy can be found for scrapping a fully-equipped airport terminal in the development of which all interests, including the Federal Government, has caused to be expended so much in resourceful initiative, constructive planning and in actual money and, which, in consequence, has been brought to a such a high plane of efficiency as the Newark Metropolitan Airport.

It also said:

The Newark Metropolitan Airport is located at the very threshold of New York City, the world's greatest market, and accordingly occupies a most strategic position in serving the entire metropolitan area, as well at the Nation at large, in all branches of air transport. It adjoins the port of Newark where waterway communication is maintained with the seaports of the entire world. It is served by an intermeshing network of superhighways that afford unparalleled motor transit to all sections of the United States. It faces the approach, at surface level, to the famous Pulaski Skyway, which empties into the Holland Tunnel. In a word, it is an integral part of a highly developed transportation system which, in addition to highways and waterways, includes the terminal approaches of five major railway trunk lines. This concentrated coordination of all transport facilities is without parallel in any city in the East.

It also states:

Of outstanding importance, however, is the fact that the flying field is in the very center of a tract of land comprising approximately five square miles, which is either owned by the city of Newark or under municipal control. As a result, building restrictions in the immediate vicinity of the airport can be imposed at will to prevent the future erection of any structural menace to flying.

On page 12 it says:

The future of commercial aviation depends upon facilities for passenger service as well as the expedition of the mail service. That is why air transport companies have entered into such keen competition in affording the traveling public every possible comfort and convenience, as well as the utmost in safety in daytime and overnight flights. For that reason, direct highway and railway connections must be made an essential part of the facilities of any successful air transport terminal. These facilities the Newark Metropolitan Airport possesses in their most highly developed form.

Then Mayor Ellenstein dwelt on the safety aspects of Newark Airport, indicating that it was equipped with the most modern safety devices, stressed that "weather conditions" are an "important factor in terminal operations", pointed out that the "records support Newark Airport's natural advantages" and declared that "Newark Airport presents minimum approach hazards".

In September 1935, the Newark Star-Eagle ran a story stating that Mayor Ellenstein announced that Federal authorities had approved a public works contribution of $3,363,758 for improvements to Newark Airport. After mentioning Newark's contribution of $614.653, then the then Mayor Ellenstein continued: "Newark Airport will become the outstanding airport in the world."

Mr. KLEIN. You offer that brief in evidence?

Mr. TOBIN. Yes, sir.

Mr. KLEIN. The city of Newark brief by Mayor Ellenstein dated June 20, 1935, will be received in evidence and marked "Exhibit PA–14."

(The item referred to was marked "Exhibit PA–14" and made a part of the committee files.)

Mr. TOBIN. In a supplemental brief for the retention of Newark Airport as the eastern air-mail terminal, filed on January 20, 1936, with the Bureau of Air Commerce, the then mayor of the city of Newark, Ellenstein, states in part:

Average weather conditions at the Newark Airport, especially as relating to the prevalence of fog, are far more favorable to flying. All economic factors involved in commercial air transportation operations are met to greater advantage at the Newark Airport. It is obviously of national import—

he says—

that the eastern air-mail terminal be located at a point where it can be of the greatest service to the greatest number throughout the United States.

And he concludes:

And most certainly the Federal Government isn't going to permit New York to accomplish the same purpose by forcing Newark to sacrifice any part of its present or future volume of airway traffic. That is inconceivable.

In the fall of 1939, the Civil Aeronautics Authority, on the application of American Airlines and three other major transport companies, for certificates of convenience and necessity to serve North Beach Airport, held hearings to determine whether that New York City air-

port—which is now La Guardia—should be designated as a co-terminus for airline operations to and from the northern New Jersey-New York metropolitan region.

Mayor Ellenstein appeared for the city of Newark. His testimony includes the following, and I quote:

> Newark Airport is naturally less hazardous; its average weather conditions are more favorable; all economic factors are met to greater advantage; any divergence would involve needless expenditure of public and private funds, and of added importance is a vast development project and the future of airway traffic.

On February 8, 1940, after the CAA rejected Newark's argument and designated the New York City airport as a co-terminus, Mayor Ellenstein appeared before a subcommittee of the Committee on Commerce of the Senate and argued that Newark's important position in regional air traffic should be preserved and that the decision of the CAA was the result of prejudice which should be investigated by Congress.

In a telegram dated June 24, 1936, to American Airlines, Inc., Mayor Ellenstein stated:

> As you know, I am an aviation enthusiast, and as mayor of the city of Newark I have tried to do everything possible to increase the facilities at Newark Airport to provide for the utmost in the accommodation of transport companies and in the safety and expedition of aerial traffic. It was this personal and official concern that primarily motivated me in securing Federal grants to make possible the expansion of the field, the building of a mammoth hangar, and the ultimate beautification of the flying field.

On April 23, 1940, Commissioner Ellenstein wrote United Air Lines Transport Corp., Transcontinental & Western Air, Inc., Eastern Airlines, Inc., and American Airlines, Inc., in part as follows:

> As you know, the city of Newark was a pioneer in the field of municipal airport construction. Envisioning the possibilities of aviation, and its importance to the nation, and conscious of its capacity to serve in this field, the city of Newark built its great airport and since 1928 invested approximately $6.5 million in its development. In 1935 an attempt was made by New York City to wrest from Newark its designation as the eastern air mail terminus of the United States. I carried on—

he says—

> a long and difficult fight to prevent the transfer of this designation.
>
> In the meantime, Newark continued to make investments to keep its airport abreast of the rapid advances that were being made in aviation.

At a meeting of the commissioners of the City of Newark on April 16, 1941, Commissioner Ellenstein sponsored a resolution to adopt a lease for the use of Newark Airport by American Airlines, Inc., stating:

> The airport can go forward and become the great airport terminal that it was in the past.

On November 6, 1946, Commissioner Ellenstein supported a resolution for the purchase of additional airport property which referred to the fact, and I quote:

> That a plan of development of the port area of the city of Newark, including the airport, has been in contemplation for the past several years.

The Newark Star-Ledger of October 14, 1947, carried the very amusing news story entitled "Both Sides of the Airport Question." The left-hand column is entitled "For a Bigger Airport—Meyer C.

Ellenstein." The right-hand column is "Against a Bigger Airport—Meyer C. Ellenstein." I think that the committee might like to have that in the record, too, and I offer it as an exhibit.

Mr. KLEIN. The Star-Ledger clipping of October 14, 1947, will be received in evidence and marked "Exhibit PA–15."

(The item referred to was marked "Exhibit PA–15" and made a part of the committee files.)

Mr. TOBIN. Newark continued to look forward to the development of the airport. For example, on March 17, 1948, the Committee on Federal and Interstate Relations of the New Jersey Senate held a public hearing on the New Jersey-New York airport bill introduced in the New Jersey State Legislature. At that public hearing the corporation counsel of Newark stated that the city of Newark thought that the legislation should be available in the eventuality that the city of Newark and the port authority came to an agreement on airport financing and operation.

Further interest of the city of Newark in the development and expansion of Newark Airport is found in the Municipal Yearbook of 1946–47, published by the Board of Commissioners of the City of Newark. On page 16 of that publication, in speaking of the Newark Airport and Seaport, it is stated:

> The great potentialities of the area as indicated by the war activities at the two ports—sea and air—may be realized in the near future. The Central Planning Board of Newark has recommended the expenditures of millions for the improvements at both ports.

I would like to call the attention of the committee to the fact that the part played by the city of Newark was equally important in affirmatively cooperating in the recent development of Newark Airport.

A cardinal feature for the development of Newark Airport was the southward expansion into the city of Elizabeth. This feature was specifically provided for in the port authority's airport agreement with the city of Newark.

I have previously mentioned that the port authority's proposal had been presented to the city of Elizabeth in August 1946. I may say that even prior to that, in April 1946, I have personally reviewed the proposal with Mayor Kirk at his office here in Elizabeth. The Newark Evening News of April 19, 1946, carried this story, and I quote:

> Discussions are progressing here looking toward the reclamation of 400 acres of tax lien meadowlands for industrial development, in the event Newark Airport-Seaport area is taken over and expanded by the port of New York authority.
>
> Mayor Kirk disclosed yesterday he received a call from Astin J. Tobin, executive director of the authority. He added that Tobin indicated the Elizabeth meadows are being taken into consideration because the Newark meadows alone will not be adequate for the contemplated expansion.

On September 9, 1947, I wrote Mayor Kirk as follows:

> MY DEAR MAYOR: I am inclosing for your information and convenient reference two copies of the printer's proof of the draft of agreement between the city of Newark and the port authority with respect to the Newark marine and air terminals. We should, of course, be very happy to discuss any of the provisions of the agreement with you at any time.
>
> I read your statement which appeared in the Elizabeth Journal last Saturday with a great deal of interest. Your recommendations and the procedures outlined are constructive, and should lead to a clarification of the whole airport proposal.
>
> You may depend upon our immediate cooperation with your committee.

The bi-State statutes authorizing the port authority to go forward with the development of airports specifically provide that the port authority shall have no power to condemn real property owned by municipalities, nor to acquire such property otherwise than with the municipality's consent. As you have noted, the Newark Airport agreement obligated the port authority to—

> expand the air terminal area southward through the acquisition of an additional area of approximately 800 acres more or less across the city line in the city of Elizabeth.

Now, within that area of 800 acres in the city of Elizabeth, there was, first, a tract known as the poor farm area, consisting of about 22 acres, title to which was vested in the city of Elizabeth, and also, second, there was nearly 2 miles of two dedicated city streets known as Division Street and Bay Avenue. Without the acquisition of this property from the city of Elizabeth, and the vacation of these dedicated streets, the southward expansion of the airport under the terms of the Newark agreement would have been impossible.

On December 13, 1949, therefore, we met with the city council, the acting mayor and other officials of the city of Elizabeth. We discussed the port authority's obligation to expand the airport into the city of Elizabeth, and our plans for the development of that area of the airport.

One of the main topics of the conference was the effect which that expansion of the airport would have on the industrial development, particularly the areas surrounding the perimeter of the airport. Division Street and Bay Avenue gave access to large sections of meadowland along Newark Bay, which the city officials believed were suitable for industrial development. The city officials expressed concern that the vacation of these streets for airport purposes would preclude access to these potentially valuable areas between the right-of-way of the Jersey Central Railroad and Newark Bay.

We assured the city officials that we recognized this problem and would cooperate with the city in finding a satisfactory and constructive solution.

In addition to discussing the importance of the airport to future business and industrial development of the city of Elizabeth, we discussed the returns which the city might expect from personal property taxes on these facilities of the airport tenants located on the portion of the new airport on the city of Elizabeth.

At the conclusion of the conference, the following joint statement was issued to the press by the Elizabeth City Council and those present, including the mayor of Elizabeth. I quote from the Elizabeth Daily Journal, December 14, 1949:

> Thomas A. Ford, president of the city council and acting mayor, and Daniel J. Tracey, Jr., chairman of the council's finance committee, stated that they and members of the council, City Engineer Thomas E. Collins, and City Attorney Louis P. Longoboardi, met with representatives of the Port of New York Authority and discussed mutual problems of the city and the port authority presented by the future development of Newark Airport, particularly its expansion into the city of Elizabeth.
>
> Mr. Ford and Mr. Tracey said the entire conference had been most friendly and constructive. They said that they were confident that with continued good will on both sides, an agreement could be worked out for the future development of the airport that would redound to the benefit of Elizabeth and the future development of northern New Jersey in this air age.

The conference dealt with the industrial development of Elizabeth and the integration of that development into the expanding use of the airport. Air cargo and its importance to industrial northern New Jersey and the employment in the various services and facilities that would be available at the airport were discussed thoroughly.

City Engineer Collins, with members of the port authority staff, also reviewed problems of highway access.

For the port authority, Executive Director Austin J. Tobin expressed his appreciation of the constructive purpose with which the city council had approached the discussion, and he assured the council of the port authority's desire to be a good neighbor and to provide an airport that would be an asset to the whole community.

Thereafter we held innumerable meetings with the officials of the city of Elizabeth, devoted to working out the problem of access to the meadowland in that city between the Jersey Central Railroad and Newark Bay, all of which lies to the east of the area which was acquired or was being acquired in Elizabeth for airport purposes.

Finally, the city agreed that it would vacate Division Street and Bay Avenue within the area acquired for airport purposes. By way of consideration, the port authority agreed to dedicate for street purposes property along the southern perimeter of the airport area upon which the city could establish a new road to be known as North Avenue. This required a three-party agreement between the city, the New Jersey Turnpike Authority, and the port authority under the terms of which the port authority and the turnpike authority agreed to share the cost—about $1 million—of grading and paving North Avenue and of bridging over both Jersey Central Railroad tracks and the New Jersey Turnpike then being constructed parallel to and adjoining the tracks of the Jersey Central Railroad. This agreement was entered into with the city of Elizabeth on July 27, 1950.

On the same day, July 27, 1950, the city of Elizabeth vacated the streets within the expanded area of the airport and accepted dedication of North Avenue. Thereafter, the city of Elizabeth sold to the port authority its right, title, and interest in Division Street and Bay Avenue, and its ownership of the 22-acre tract on the westerly side of the airport expansion area. The purchase price paid by the port authority to the city of Elizabeth for this latter tract was $160,000. This conveyance was accomplished by a resolution of the City Council of the City of Elizabeth dated April 19, 1951, a conveyancing agreement dated April 20, 1951, and deeds dated June 18 and June 27, 1951.

The Newark Evening News said of this airport agreement with the city of Elizabeth:

This settlement will provide adequate access to the Elizabeth meadowlands area and make possible its development. Both authorities have shown a willingness to meet the reasonable demands of municipalities, and Elizabeth, in turn, has recognized that municipalities must accommodate themselves to modern transportation needs. The agreement the authorities have reached should set a policy for the disposition of future controversies of this kind.

In this Elizabeth Airport agreement of April 19, 1951, the port authority specifically covenanted that it would not further expand the airport nor construct runways, other than those then contemplated and known to the city of Elizabeth and approved by the CAA, without notice to the city and its citizens and a public hearing on such proposed new construction or change. This part of the agreement

between the city of Elizabeth and the port authority expressly referred to the new runway system, including runway A, which, as we have noted, will be completed in November.

The language of these covenants is as follows:

> Second, the port authority agrees that it will not, without the consent of the city, condemn or otherwise acquire either public or private property within the city limits outside of the area described in or acquired by the condemnation proceeding heretofore recited for air terminal purposes, other than air space, rights or easements for approach zones, turning zones or transition zones for aircraft using the Newark air terminal; and other property, space, rights, or easements for beacons, signal control systems, approach systems, or other aids to navigation in connection with the use by aircraft of the Newark air terminal. The port authority further agrees that it will not construct any runways other than those presently contemplated and now designated by the port authority as runway A, CAA designation 4R22L; runway B, CAA designation 4L22R; runway C, CAA designation 14R32L, and runway D, CAA designation 14L32R, at Newark Airport, nor change the location of any existing runway in a manner which would result in a glidepath pattern at any lower height than the existing pattern over the city of Elizabeth, without notice to the city and its citizens and a public hearing with respect to such new construction or change.

As Commissioner Sly has indicated, the port authority is required to report every year to the Governors and Legislatures of both the States of New York and New Jersey. Extracts from our Twenty-eighth Annual Report of 1948 and our Twenty-ninth Annual Report of 1949, bearing on the subject of this inquiry, are herewith furnished for your information, and I submit them as exhibits.

I also wish to submit for the record as an exhibit a complete copy of our Thirtieth Annual Report of 1950.

Mr. KLEIN. The port authority's annual reports of 1948, 1949, and 1950 to the respective Governors and Legislatures of New York and New Jersey will be marked "Exhibits PA–16, PA–17, and PA–18," respectively, and received in evidence.

(The items referred to were marked "Exhibits PA–16, PA–17, and PA–18," respectively, and made a part of the committee files.)

Mr. TOBIN. The Newark Airport agreement provides that on or before the 15th day of February of each year the port authority must deliver to the director of revenue and finance of the city of Newark—an office now held by Commissioner Ellenstein—"a complete report and account in regard to the financing, refinancing, construction, operation, and maintenance" of the airport and seaport at Newark.

I submit, therefore, for the record the reports which we have furnished to the city accordingly, in 1949, 1950, and 1951, as well as the report for 1952.

Mr. KLEIN. The port authority's annual report to the city of Newark covering the years 1949, 1950, 1951, and 1952 will be received in evidence and marked "Exhibits PA–19, PA–20, PA–21, and PA–22," respectively.

(The items referred to were marked "Exhibits PA–19 through PA–22," respectively, and made a part of the committee files.)

Mr. TOBIN. I know that the committee would like to have included——

Mr. WOLVERTON. I don't want to interrupt, but may I ask at this point whether the same report was filed with the city of Elizabeth?

Mr. TOBIN. No, sir; but they are published reports. I presume that we send them automatically to the mayor of Elizabeth, but they are

available to the city of Elizabeth and are published and are on file in the New Jersey library.

Mr. WOLVERTON. Thank you.

Mr. TOBIN. I know that the committee would like to have included in its record a summary of the funds invested to date in Newark Airport by the city of Newark, the Federal Government, and the port authority.

You will recall that the port authority assumed responsibility for the financing and reconstruction of the airport on March 22, 1948, and that the airport and seaport agreement obligated us to—and I quote:

rehabilitate, expand, improve, and develop the Newark marine and air terminals, up to the sum of $70.5 million.

Of this sum, the agreement provided that we must "expend a minimum of $50 million" for the airport and seaport "within 7 years from the effective date of the lease"—that is, by March 22, 1955.

In accordance with our obligations to the city of Newark, we had, as of December 31, 1951, expended or committed the sum of $24,402,744 for capital improvements at Newark Airport, and our capital budget for the current year includes an additional $6,987,300, or a total by the end of this year of $31,390,044, and that is only for the airport.

To complete the record, since the agreement covers both the airport and Port Newark, I should note that as of December 31, 1951, we had expended or committed for capital facilities at Port Newark, under the terms of that agreement, the sum of $10,233,423 and that our capital budget for Port Newark for additional expenditures to be made there during 1952 is $13,561,000 or a total which we will have expended in the development of Port Newark by the end of this year, pursuant to our agreement with the city, of $23,794,423.

To summarize, therefore, under the terms of the Newark-port authority agreement of 1947, the port authority will have fulfilled its capital obligations to the city to the extent of $55,184,467 by the end of this year.

The investment of Federal and local government agencies in Newark Airport as of March 22, 1948, when the port authority agreement became effective, was $23.3 million, made up of city of Newark funds of $8.2 million, United States Army funds of $9.8 million, other funds—CWA, PWA, WPA, and others—of $5.3 million.

I might add that the figures quoted were obtained from the city of Newark.

In addition to this Federal expenditure of $15,100,000 up to 1948, there have been Federal-aid agreements to date totaling $4,671,900 of which $1,011,900 has already been received. This means a total Federal investment of $19,771,900.

To recapitulate, as of December 31, 1951, the capital expenditures and commitments in Newark Airport are as follows:

Federal, $19,771,900; city of Newark, $8,200,000; port authority, $24,402,744; or a total as of last December of $52,374,644.

Of the current Federal airport-aid moneys, $1,500,000 has been assigned to the new airport terminal building. Under Federal-aid agreement also, $3,046,936 has been pledged to the new runways, including runway A, which has been referred to by Commissioner Sly, and which will be described in more detail by Mr. Glass.

Port authority funds to be expended under the terms of the agreement are, as the committee may know, obtained by the sale of our bonds to private individuals and instiutions. As has been pointed out, we have no power to tax or assess or pledge the credit of either State.

The agreement also provides, that is, the Newark city agreement, that—

None of the bonds issued by the port authority shall be a lien or charge upon the airport, nor shall they be an obligation of the city, and the port authority shall have no power to pledge the credit of the city in any way whatsoever.

The people who bought the bonds which we have issued through the last 4 years, have done so on the basis of our airport agreement of 1947 with the city of Newark and on the basis of a bond resolution thereafter adopted, constituting a contract with the holders of air terminal bonds and providing that they shall be secured by the net revenues of the air terminals, including Newark Airport, and the pledge of the general reserve fund of the port authority. The pledge of the general reserve fund as security for the Newark Airport bonds brings to their support the earning power of all of the port authority's established facilities. Surplus revenues of all of these established facilities are required under the laws of the two States to be pooled by the port authority and applied to the establishment and maintenance of the general reserve fund in and amount equal to 10 percent of the par value of all such outstanding bonds.

Commissioner Ellenstein has referred to the "profits" made at the Newark Airport by the port authority. Like the rest of the country's major airports, Newark has not earned net revenues since it opened in 1928. We have striven since 1948, with some success, to improve Newark's financial picture, which is to say that we are beginning to lose less money.

With gross revenues of $1,028,940 and operating and maintenance expense of $1,200,836 in 1951, we had an operating loss of $171,896. This compares with 1950, when an operating loss of $270,271 resulted from gross revenues of $731,991, and operating and maintenance expense of $1,002,162. These expenses include the annual rental payments of $100,000 to the city of Newark; they do not, however, include debt service payments which amounted to $250,299 in 1951, and brought our total 1951 Newark Airport losses up to $415,954.

Since we have begun operating Newark Airport in 1948, we have experienced over-all losses of $1,370,938.

A further very important point to be considered by your committee is the intrinsic, strategic value of Newark's airport and seaport to our national defense. With the experience of World War II, the Berlin airlift, and the Korean war, we are all aware of the military importance and the value to national defense of civil air transportation. In a less spectacular fashion, the major civil airports also have made a remarkable contribution to our war effort and today represent a source of critical importance to current and future national defense plans.

As has been proven in World War II and in the current national emergency, Newark Airport has a special military value because of the proximity of Port Newark. The airport and seaport together offer the finest combination of air and water transportation facilities on the east coast. As you know, the armed services utilized the airport and seaport to their utmost capacities during World War II, and, in

fact, spent millions of dollars improving and expanding these facilities. The Air Force, after recently surveying the entire west coast, again concluded that only Newark's airport and seaport could meet the urgent military requirements for handling overseas shipments destined for North Atlantic Treaty countries under the Mutual Defense Assistance Program.

While the Air Force has agreed that under present conditions there should be a minimum disruption of the handling of essential civilian and national defense commerce at Newark Airport, they are, however, today using for these purposes nine large warehouses with approximately 1,650,000 square feet of space, 33 acres of open waterside storage space, and over half a mile of wharf at Port Newark, jointly with the runways, 30,000 square feet of open paved area, and covered cargo space at Newark Airport, and the Air Force is currently negotiating with us to enlarge these facilities and areas for use in defense shipments.

In the event of another all-out war, there is no question but that the joint sea and air transportation facilities of the Newark Airport and Seaport would be critically needed for national defense purposes. If such unhappy circumstances occur, the port-authority improvements made and in the making at the airport and seaport can serve our country well. The new airport runways under construction can, if called upon, meet the most modern military requirements, and the new terminal building and existing terminal can be converted immediately to the handling of defense personnel and cargo.

The 35-foot channel, the 4,450 feet of rehabilitated docks, the 3,625 feet of new wharves, and 40,500 feet of rehabilitated rail trackage, and the 222,600 square feet of modern cargo buildings which have been provided, and the two new cargo buildings and the modern warehouse which are under construction by the port authority, all serve to increase the capacity of the port to handle such defense shipments as may be required in the future.

Thus, in 1947, the port handled 811,780 long tons of cargo, while in 1951 its volume grew to 1,842,733 long tons, exclusive of classified, substantial Air Force tonnages.

Finally, in the light of statements that were made at the last hearing before your committee, we have felt that it was essential that we submit the foregoing record in order that the committee may have the facts.

From that record it is clear that the officials of the city of Newark reviewed the problems involved in the reconstruction and continued development of their airport, asked the port authority to finance such a program, bound us by contract to carry it forward, and committed the two States, through their agency, to a wide range of collateral and binding agreements.

The city of Newark's program was authorized by the States of New York and New Jersey, endorsed by the Federal Government through its proper agencies, facilitated by the city of Elizabeth, and is proceeding in accordance with the multiple agreements involved in the record that I have submitted to the committee. The Bureau of Aeronautics of the State of New Jersey has officially approved this program in connection with the Federal-aid program.

Furthermore, as Commissioner Sly has pointed out, the New Jersey Bureau of Aeronautics, in its issue of February 2, 1952, publication

Flight Log written after the second air tragedy in Elizabeth, refers to the basic safety of flight operations at Newark, and proclaims that in the public welfare this airport must not be removed from its present location. That statement was made as of this month.

That location of the airport, its development and the alinement of its present runways was determined, supported, moved forward, and aggressively fought for and championed for 20 years from 1928 to 1948 by the city officials, including very prominently those who appeared before your committee at its last session here.

In 1947, the city of Newark officially determined that it was in its best interest to continue that program, but the cost of development and extension was too great for the city to carry out, with the approvals of the legislatures, the city officials turned to an agency of the two States and asked that agency to take over the financing from that point on.

As Commissioner Sly advised you, our director of aviation development, Mr. Glass, will outline the plan and progress of the airport development program. I would only like to observe in conclusion that during this 4-year period of basic field preparation and construction, we have been, and are today, using the same runways that were turned over to us by the city of Newark in 1948. We have limited their use to planes not in excess of 105,000 pounds. This means that the aircraft using the airport today are approximately of the same general type as the four-motored and two-motored planes which operated in and out of Newark Airport during the war, and under city operation from 1945 to 1948.

Mr. KLEIN. I have been requested by Mr. Case of New Jersey, for permission for the municipal officials of Elizabeth and Newark who wish to do so, to submit a statement in writing to the chair, to rebut any statements made by members of the port authority, and without objection I am going to grant that request. This is probably a good time to adjourn for lunch.

(Whereupon, a recess was taken until 2 p. m.)

AFTERNOON SESSION

Mr. KLEIN. The committee will come to order.

Before we start to question Mr. Tobin, I might say to Mr. Case that I had previously given authority for the municipal authorities who might want to question the statements of the New York Port Authority officials, to do so, but in view of the fact that all the witnesses are being sworn, if the municipal officials do submit questions and the sworn witnesses submit to answering those questions, the officials availing themselves of the opportunity to bring out facts to controvert the statements of the port authority witnesses should also do that under oath.

Mr. CASE. I understand that, sir.

Mr. KLEIN. Do you have anything you wish to ask, Mr. Wolverton?

Mr. WOLVERTON. The questions that I have already indicated I wish answered, I assume, from what has been said, that it would be considered more appropriate to address those questions to Mr. Glass than to anyone else.

Mr. KLEIN. Then does that mean you prefer to wait for his testimony before asking your questions?

Mr. WOLVERTON. Yes, in view of the fact that Mr. Tobin has indicated Mr. Glass is best qualified to do so. Under those circumstances, I will hold my questions until after Mr. Glass has had an opportunity to give his statement.

Mr. KLEIN. Does that apply to you, Mr. Hinshaw?

Mr. HINSHAW. Yes; but there are a few questions I would like to ask at this time.

Mr. KLEIN. All right.

Mr. HINSHAW. Mr. Tobin, in view of the lease made between the port authority and the city of Newark, which I have not yet had an opportunity to read, are you obligated to operate this airport?

Mr. TOBIN. Yes.

Mr. HINSHAW. Would you be violating your obligations under the lease if you did not operate the airport?

Mr. TOBIN. Yes.

Mr. HINSHAW. What would be the result?

Mr. TOBIN. It would involve our contractual obligations which, in turn, are built on the city of Newark's agreement with the port authority, the bondholders, the AAA, and our obligations to the military under the Federal Aid Act, and our obligations to the airlines, under which we have agreed to operate the Newark Airport. You can readily see that all these legal obligations are involved, and I would be the last one to pretend to know the legal answers to that situation and I think it would be a long time before even those best qualified to do so would be able to give all of these legal answers.

Mr. HINSHAW. At a preceding hearing, an official of the city of Newark, I believe it was the mayor, declared that the city of Newark would be glad to rescind the lease of the airport to the New York Port Authority. What would be entailed by such a decision, Mr. Tobin?

Mr. TOBIN. You mean if the lease were rescinded by mutual agreement?

Mr. HINSHAW. Yes, if it were possible.

Mr. TOBIN. That would only release us at the start in attempting to unravel the Gordian knot that has resulted on the basis of that agreement. It is rather futile for them to say that they would be willing to release us from the lease or to rescind the lease because on the basis of that lease we have already outstanding $17 million in airport bonds. On the basis of that lease we have committed ourselves to the construction of some $25 million worth of facilities as of last December.

You say that the mayor of the city of Newark made that suggestion; would he tell us how to handle that? Also, our lease to the airlines to go forward with the construction of modern airline facilities in accordance with the lease, how would he handle that? I suppose he assumes that he would be able to get the releases from the airlines and the Federal authorities, who have been responsible for about some three or four million dollars in Federal grants to the airport on the basis of the Newark lease since 1948. All of those problems would be involved in such a step as he suggested. It is not as simple as—it is not at all as simple as with an ordinary tenant on the third floor when the landlord says, "I don't like you and you don't like me, so why don't you just get out and go someplace else?" It is not as simple as all that. If we could do that, that would be very simple, but, as I have already indicated, a ripple of these waves covers a pretty vast

territory and there is a vast amount of legal disentanglement to be faced.

Mr. HINSHAW. There is another subject that comes along and that is, in all events if it were considered in the national interest of the armed services of the United States, I presume that they have the authority, under Federal law, to take over and operate the airport at any time?

Mr. TOBIN. Without any question.

Mr. HINSHAW. You say that you have a request at the present time from the Air Force to reopen the Newark Airport for transshipment, is that correct?

Mr. TOBIN. Yes; that was made by the local commander, Colonel Muhlenberg, and it involves flying in planes and supplies in the assistance defense plan in Europe, and this has been very much scrambled up and he has been trying, as best he can, to use the field at Floyd Bennett Field. They are having difficulty in handling these airplane shipments to Newark. Now the planes must be flown to Floyd Bennett Field, put on barges there and shipped to Port Newark for processing and transshipment. The colonel has described that as being very inefficient and as unsatisfactory.

Mr. HINSHAW. These facilities at the Newark Airport, are they now available to the Air Marine Force?

Mr. TOBIN. The Army Air Force has the entire area at one side known as Highwater, with its cargo sheds and a considerable area on either side of that. At the airport itself, they have 50,000 feet of aircraft parking space, and are using the facilities for the processing of these planes and also they rent from the port authority the New Jersey terminal at Delancy Street, but they also need additional space for the processing of these planes and they are considering condemning the additional space. We have earnestly urged them not to do so and that we would make available to them additional space and that bears on your question as to the power to condemn.

We are asking them not to condemn and told them we would try to furnish them with the necessary facilities and hangars.

Mr. HINSHAW. The allegation was made that the Port of New York Authority—I can't remember the exact terms—but it was something to the effect that they worked on a basis of star chamber proceedings, that when they held their meetings for consideration of various projects, the public was excluded from any and all such proceedings. Have you anything to say about that?

Mr. TOBIN. I have this to say: That all of our hearings are public and were public.

Mr. HINSHAW. All hearings?

Mr. TOBIN. The meetings of the board are public meetings, regular meetings once a month and attended by the press, and are very thoroughly and profusely reported. I may also say that as a matter of policy, we feel that our records are public and that we must answer to the press, who speak for the people and are ready and do answer any questions at any time, so that when any authorized person asks a question about the port authority records and has the right to ask that question, he is given a prompt answer.

The accounting procedures, financial statements, and anything pertaining to the operation of the port authority is available to any per-

sons authorized to ask about them and that is daily taken advantage of by both the people and the press.

Also, as I said in my statement bearing upon the statement made at the last meeting, I know that absolutely no request that was made by the city of Newark and the city of Elizabeth at the public hearings on the question of low-flying planes.

Mr. HINSHAW. After the board of commissioners of the New York Port Authority has reached a decision as to what they think is the correct thing to do, does anyone else have the right of approval or veto over the actions or decision of the commission?

Mr. TOBIN. Any decision that the port authority or the commissioners of the port authority may arrive at or any action that is proposed to be taken by the commission body of the port authority is not official until it is delivered to the offices of the governors, and each governor has the right to veto the action of any official of his State. The period for the New York State veto is 5 days and for New Jersey it is 10 days. Minutes are prepared immediately after the meeting and a copy of the minutes is formally submitted to the office of the governor and the board of commissioners is not permitted to take any action at the meeting until after 10 days following the veto date.

Mr. HINSHAW. What is it that the governors have to approve or disapprove?

Mr. TOBIN. Expenditures made in the city of Newark. He has the power to veto the action of the board. At times, bearing on that very point, Governor Driscoll has raised serious questions on some of the proposals made by the board of commissioners. For instance, there was the question of the location of the terminal building. Governor Driscoll had serious reservations as to whether or not we were correct in our judgment as to the location of that terminal. He asked us to come down to discuss the matter, and the commissioners went down and canvassed the whole question with the Governor, discussing it thoroughly, and, as a matter of fact, we suspended work on the very first contract for 2 months because of that situation. I give you that as a graphic instance of the interest that the Governors of the two States show in reviewing our work.

Mr. HINSHAW. Now, as I understand it, the port authority and the city of Newark are parties to a lease in which the bi-State body has leased certain properties, the consideration of the lease requiring not only the payment to the city of Newark of $100,000 annually, but likewise the expenditures of certain amounts of money—actually $70.5 million; is that correct?

Mr. TOBIN. Yes.

Mr. HINSHAW. And if you fail to proceed with the undertaking and fulfillment of that obligation, you would be in violation of the lease?

Mr. TOBIN. That is right.

Mr. HINSHAW. What would be the effect of that violation, if you did violate it? In other words, if you failed to perform under the terms of the lease?

Mr. TOBIN. Well, under the airport statute itself, the municipality with which we make the lease is specifically given the right to sue the port authority.

Mr. HINSHAW. For specific performance or for damages?

Mr. TOBIN. For both. I might say, as to going forward under our obligations and agreement, that is, the agreement between the port

authority and the city of Newark, the minutes of our board were naturally approved, or shall I say not vetoed by the Governor. I don't think that any government would want to put itself in the position of having approved an action and then interfering with the carrying out of that action. When the minutes of a board meeting are submitted to the governor, and those minutes contain a proposed course of action and the governor does not veto it, of necessity, under the statute, that course of action has been approved. Under those circumstances, certainly no government would proceed to interfere with the execution of whatever project was contemplated.

Mr. HINSHAW. I have in mind the fact that when you approved a lease in 1947, that the minutes must have lain on the desks of both governors for the respective 5 and 10 days before being approved.

Mr. TOBIN. That isn't quite correct. It was approved by both Governors forthwith. You see, it was a very important matter and the governors indicated to us their approval as of the date of the agreement, that is, as of the date the agreement was signed. We do that very often on important matters such as bond sales, where we cannot wait until the bids come in. In such cases we frequently clear the matter with the Governors beforehand. The commissioners outline to the Governors what must be done, must be done on that day, and if the governors approve it, they will give their approval forthwith.

Mr. HINSHAW. Therefore, as I understand it, the lease with the city officials of the port authority, the original lease, was approved forthwith by the Governors?

Mr. TOBIN. Yes.

Mr. HINSHAW. And I suppose, if he should accede to the demands of the municipal officials, and I have seen them placed in the resolutions of the city councils, that certain funds are to be spent for further developments, it would be difficult for the Governor to go back on his former agreement?

Mr. TOBIN. I would say it would require a very careful consideration.

Mr. HINSHAW. And all that Governor Driscoll has done, as I understand it from you, is that on certain occasions, or on a certain occasion, he disapproved of the location of certain of these improvements temporarily?

Mr. TOBIN. Yes; and I may say that the Governor is very interested in the airport development, as he is of other public utilities in New Jersey, such as the New Jersey Turnpike and other matters. He is very active in these matters, and the whole matter of the new runways, the reasons why new runways are necessary, and the plans as to the possible future traffic deviations as between New York International and Newark Airport—all of these have been closely followed by the Governor and are matters of close concern to him, and I would definitely say that Governor Driscoll has been an active governor in interesting himself in these matters and consulting the commission and its staff.

We have been to his office and he has raised questions about different things and he has been very attentive to the explanations that we have made on those things in the past. He puts us through our proof on any project that we have in mind.

I think we have answered your question that he is actively interested in the Newark Airport, as well as other public facilities.

Also, on the other side of the river, Governor Dewey has taken a personal interest in the linking of our airports—the Newark Airport with those of New York International Airport—and I think you gentlemen will recall his activities in the matter and the fact that he brought the airlines and ourselves together in a serious conference which finally resulted in a very satisfactory conclusion.

Mr. HINSHAW. I seem to remember that there was considerable controversy about the amounts to be charged for landings at the Idlewild Airport, which restrained certain airlines from moving to Idlewild from LaGuardia. I don't know if that is correct. Do you know anything about that?

Mr. TOBIN. There certainly was a great dispute for a long period of time on that point.

Mr. HINSHAW. Does either Governor concern himself particularly with matters that relate to the facilities that are wholly within the other State?

Mr. TOBIN. I would say that is the whole theory behind the bi-State movement. The port authority compact was for the purpose of developing the New York port area. It is a matter of regional concern. It is not just a matter for one State. You are never going to have a situation where New York would be prosperous in a depression and New Jersey vice versa.

As I have already outlined, we have found great interest by both Governors in the projects and activities of the port authority. Naturally, the matters in their own State, where they have the power of review, would come first in their consideration, but I know personally that Governor Driscoll has, on many occasions, gone to New York to inspect the International Airport and had previously expressed a desire to do so. We have also taken Governor Dewey over our own facilities in New Jersey. Answering your question directly, I would say that, although matters involving their own State will take first consideration, both Governors have a keen interest in all the projects of the New York Port Authority. We have had the New York legislators come to New Jersey to inspect the projects and facilities there and we have had New Jersey legislators taken to New York.

Mr. Glass and I have outlined a program that keeps them informed on the entire situation and makes them interested in the whole region—and that includes the governors of both States and the legislatures of both States.

Mr. HINSHAW. I think that is all.

Mr. KLEIN. Do you wish to ask any questions, Mr. O'Hara?

Mr. O'HARA. Yes, sir.

Mr. Tobin, as I understand it from your statement, the port authority does not have the power of condemnation as to properties of municipalities.

Mr. TOBIN. That is correct, but it does have powers of condemnation as to private property.

Mr. O'HARA. In the enlargement of the Newark Airport, as I understood from your testimony previously, you reported that it was necessary for you to have and that you did have the cooperation of the municipalities of Newark and Elizabeth in order to enlarge the airport.

Mr. TOBIN. Yes.

Mr. O'HARA. Do you also, in that connection, exercise the right of domain over private property?

Mr. TOBIN. Yes.

Mr. O'HARA. And did you do so in the enlargement of the airport?

Mr. TOBIN. Yes; we condemned the property of the Jersey Central Railroad, which was in the Elizabeth part of the acquisition, and we settled that case at that time for $3 million. There were other private condemnations of property at the time.

Mr. O'HARA. Of course in the development of your new runway, that is, runway A, you would meet a different routing of planes coming in and out of Newark?

Mr. TOBIN. Yes. Mr. Glass will go into the details of that and will be able to give you considerably more information on it than I would be able to give you. However, I can say that the new runway, runway A, will be a vast improvement over what we have, and will take planes in excess of 150,000 pounds. Runway A will be a $10 million runway, but as I just stated, Mr. Glass will be able to tell you all about that.

Mr. O'HARA. In the development of the improvements that have been made and are under consideration or under improvement at the present time, and the other expenditures which have been made by the Port of New York Authority, and which are to be made in the future, the port authority, I assume, has issued certain bonds or obligations which are obligations of the port authority, based not only on the operations of the other two airports, but the operations here in Newark?

Mr. TOBIN. Yes; there is a full pooling of all revenues, but the initial obligations are those on the airport in Newark.

Mr. O'HARA. But one of the legal factors of the bond sales is based entirely on the lease of the Newark Airport to the New York Port Authority or the Port Authority of New York?

Mr. TOBIN. That is the fundamental documented property.

Mr. O'HARA. And, Mr. Tobin, in the making of that lease, could you tell me how many million dollars' worth of bonds have been sold for the development of the airport in Newark alone?

Mr. TOBIN. $17 million worth of bonds were actually sold, but some other additional bonds will have to be sold in the near future to cover certain construction commitments because we have spent $24 million or committed that much to be spent in the near future.

While the actual issuance of bonds is only the $17 million that I have stated, the actual expenditures or commitments under that plan are $24 million, or in excess of that.

Mr. O'HARA. May I ask whether in the operation of the three airports—LaGuardia, Idlewild, and Newark—it is not only the operation of these places that is involved but the relative importance of one to the others as landing places?

Mr. TOBIN. A field such as Newark is of tremendous importance to the area in this part of the country, as well as to the international situation and all interests involved.

Mr. O'HARA. I presume when this airport was closed it created a tremendous problem to the authorities in the matter of alinement of landings and take-offs.

Mr. TOBIN. It was a terrific problem. The traffic situation that had to be ironed out by the airplane companies and the CAA was a terrific

problem. They are trying to resolve that by the work of the Rickenbacker committee. Later Mr. Glass will touch on that and give you considerably more information than I can. He will answer any questions that you may have on that point, but I believe that the best witness on that is Captain Rickenbacker. Our chairman is a member of the committee, but I might say this—that all the other reassignments of planes of international flight moved over to LaGuardia.

We have gone ahead with extensive construction programs to meet that type of airline-industry problem, and we have worked them out, and, as you can imagine, they are a very considerable and serious problem.

Mr. O'HARA. Can you tell me whether the new runway construction and the improvement of the airport facilities are going to continue or close down completely?

Mr. TOBIN. That awaits the general recommendation of what comes out of this and other committees looking into the matter.

Mr. O'HARA. I think that is all, Mr. Chairman.

Mr. KLEIN. And carrying a part of that question a little further, isn't it a fact, considering even the safety angle, that if Newark Airport is closed and some condition should arise that would make landings imperative, the fact that it is closed would really be a safety factor—in other words, a factor against safety?

Mr. TOBIN. It does involve the operation of two instead of three airports.

Mr. KLEIN. In other words, if the weather got bad and it became necessary for a plane or a group of planes to be grounded, you would have only two airports instead of three?

Mr. TOBIN. That's correct, sir.

Mr. KLEIN. Has there been any dispute or misunderstanding with the municipal authorities, either of Newark or of Elizabeth, prior to the time of the first accident that took place around Christmas of 1951?

Mr. TOBIN. All through last summer Commissioner Ellenstein, of the city of Newark, was opposed to the agreement and has continued his opposition from time to time. There has been on his part that general antagonism and opposition to any development of the airport under the lease—and when I say "on his part," I am referring to Commissioner Ellenstein.

Before Christmas the difficulty—I won't say difference of opinion, but the problem which in many cases we were sincerely involved with, and which perturbed the local public, was because of the noise over Elizabeth last summer, and it is a very serious problem. I gave you that in my previous testimony. No one can say that it was not a nuisance. It was. A very well-intentioned public officer such as Senator Hand and others wanted to meet that problem and did what they had to do.

I would not say, however, that the noise problem represented the difference of opinion. The port authority was wrestling with that problem and was as earnestly desirous of solving it as was the public in Elizabeth. As I said, we were wrestling with that problem all summer, and there are other problems that we are wrestling with, but of course, Commissioner Ellenstein has been opposed to us all along on almost every point.

Mr. KLEIN. Was there any demand last summer or any time after that that the Newark Airport be closed?

Mr. TOBIN. I think there was, Congressman. My best recollection is that Commissioner Ellenstein has been trying to close the Newark Airport ever since the port authority took it over. I don't recall that there was any serious movement other than that of Commissioner Ellenstein to close the airport, although I am subject to correction on that point, and that movement on Commissioner Ellenstein's part was long before the noise became a nuisance or before last summer, but I don't recall any other responsible local officer or official—anyone in authority, other than Commissioner Ellenstein—wanting to close the airport. There were officials who wanted the noise to be done away with, but not to close the airport.

Mr. KLEIN. Do you have any record as to the number of accidents that have taken place on or from the airport under the jurisdiction of the port authority?

Mr. TOBIN. Yes, sir.

Mr. KLEIN. Do you have those figures? Is that set forth in your statement?

Mr. TOBIN. No; but we have all the information on that point, and if you would like to have it, we will submit it.

Mr. KLEIN. I would like to know the number of accidents at the airport under the jurisdiction of the port authority since your operation of it, and that means also LaGuardia and Idlewild as well as Newark.

Mr. TOBIN. We will let the clerk have that within a few days, sir.

Mr. KLEIN. Mr. Carlyle, do you have anything you wish to ask?

Mr. CARLYLE. Yes. Do I understand, Mr. Tobin, that in the term of 50 years all of the outstanding bonds will be matured?

Mr. TOBIN. No; the bonds issued under the lease——

Mr. CARLYLE. Have the bonds been issued?

Mr. TOBIN. Yes.

Mr. CARLYLE. Could you tell us when it is anticipated these bonds will mature?

Mr. TOBIN. As I recall, within 30 or 40 years. I think it is about 1980 that is the maturity date of the outstanding bonds.

Mr. CARLYLE. What portion of the airport was used in World War II?

Mr. TOBIN. All of it.

Mr. CARLYLE. The Air Force was holding it by way of purchase or lease?

Mr. TOBIN. They leased it.

Mr. CARLYLE. I think that you said the port authority pays to the city of Newark $100,000 a year for the rental of the airport property.

Mr. TOBIN. Yes.

Mr. CARLYLE. Has that amount been paid?

Mr. TOBIN. Yes.

Mr. CARLYLE. Annually?

Mr. TOBIN. Yes.

Mr. CARLYLE. Has it been accepted?

Mr. TOBIN. Yes; the payment of $100,000 was accepted a week ago.

Mr. CARLYLE. What amount is paid annually to the municipality of Elizabeth?

Mr. TOBIN. No amount as yet. We told the city of Elizabeth that in taking over any of their property, where there was a loss of taxes

to the city, we agreed to reimburse the city annually for the loss of taxes that they had been receiving prior to the time that the port authority took over any municipal property and we have committed ourselves, with the city of Elizabeth to make that agreement with them, and they will go along with that agreement and the full amount of taxes, since we took it over, is to be paid to them, and my recollection is that it is about $16,000 a year. That is the property actually condemned and taken, under the same agreement that we had with the city of New York and the city of Newark for terminal property and other buildings, which is really railroad terminus in New York and we have at all times agreed to pay the full amount of taxes lost.

Mr. CARLYLE. I believe that is all.

Mr. KLEIN. Mr. Mack?

Mr. MACK. I think that Mr. Glass will probably cover the questions I have in mind. However, I was wondering about runway 24—the runway that was causing this controversy, evidently, in this area. I presume that is the runway you had the complaints about, runway 24, Mr. Tobin.

Mr. TOBIN. That was one of them.

Mr. MACK. Then, let me ask you this question. At this time that has not been developed by your authority, that is, by the port authority?

Mr. TOBIN. No; that is just the way it was when the city of Newark was running the airport, which was up to March or April of 1948.

Mr. MACK. It is the same as the runway was when the city of Newark was operating it prior to the time that you took over?

Mr. TOBIN. Yes, sir.

Mr. MACK. Also in your plans for this new runway, do I understand that you plan to move your radio or radar range station, or has that been discussed with the Aeronautics Board?

Mr. TOBIN. Mr. Glass will discuss that. I prefer that he do it.

Mr. HINSHAW. Mr. Tobin, I would like to refer to page 14 of your mimeographed statement, in which you say in part, referring to the opposition led by Commissioner Ellenstein, that—

> The basic ground of this opposition was the contention that the port authority's guaranteed annual rental of $100,000 per year was unsatisfactory, that the lease provision for the payment to Newark of 75 percent of the annual revenue after payment of operating expenses and debt service charges was illusory, and that the port authority proposal did not assume payment of the debt previously incurred by the city for the construction of the Newark marine and air terminals.

Now, Mr. Tobin, do you have any knowledge or estimate of the indebtedness incurred previously by the city of Newark in the construction of the marine and air terminals?

Mr. TOBIN. They had incurred seaport bonds aggregating $10,390,000 and airport bonds aggregating $7,600,000 and that is to be found on page 3 of the Bartholomew report.

Mr. HINSHAW. Does the $100,000 per year of rental that the port authority pays to the city of Newark service these bonds?

Mr. TOBIN. I wouldn't assume so. It was never intended to do that. But on the other hand, they would save from $700,000 to $800,000 a year because their average loss in the operation of the facilities, that is, the airport and seaport facilities, was $800,000 a year. Our proposal to the city of Newark was that we would take the job on of im-

proving the facilities and spend about $70 million on them and give them $100,000 a year in the bargain.

Mr. HINSHAW. To your knowledge, did this opposition to the original lease and from then on until the time last summer when the noise question was brought up, was his opposition on these grounds or were there other grounds added?

Mr. TOBIN. He has opposed us on every ground that he could. These were the principal grounds of his opposition. This was a fair settlement on the basis of the record at that time, but if there was anything that could be said in opposition to the port authority taking over the Newark Airport since 1948 on, Commissioner Ellenstein has said it.

Mr. HINSHAW. Mr. Tobin, there was a letter addressed to the Department of Commerce under date of February 18, 1952, concerning the former attitude of the officials of the city of Newark concerning the establishment, development, and continuance of the Newark Municipal Airport. That letter happened to be in the files of the Department of Commerce and enclosed or attached to that letter was a letter from an official of the city of Newark addressed to Mr. Thomas Drumm, Deputy Zone Administrator, Real Property Disposal, War Assets Administration, 40 Wall Street, New York 5, N. Y. That letter was dated January 6, 1948.

Now, I don't know whether you placed that letter in evidence or not.

Mr. TOBIN. I don't know. I don't even recall it.

Mr. HINSHAW. Shall I read it?

Mr. TOBIN. Yes.

Mr. HINSHAW. The letter reads as follows:

In connection with the pending surrender by the Government of the Army Air Force lease at Newark Airport, I would call your attention to paragraph 14 of the supplemental agreement (No. 6) of November 19, 1945, between the city and the United States. This paragraph reserves to the United States the right at its election to surrender to the city of Newark such buildings, structures, alterations, or other improvements as have been placed on the premises in lieu of removing the same and restoring the premises. And in such event, the city of Newark agrees to release and discharge the United States from any and all obligation of restoration.

It is my understanding that the Government intends to exercise this right of election. There can be no question but that this will relieve the Government of any obligation to remove the improvements and restore the premises.

I feel free, therefore, to assure you that the city of Newark will be willing to accept a surrender of the leased premises and improvements thereon, in lieu of compliance by the Government with the covenant for restoration of the premises, and to discharge the Government from any and all obligations for restoration.

I trust that you will be able to expedite formal surrender and this matter can be completed at the earliest possible date. If there is any further assistance I may be able to give you, please feel free to call upon me.

Very truly yours,

VINCENT J. MURPHY, *Mayor.*

Now, enclosed with that same letter of February 18 was another letter addressed by you on March 26, 1948, to Mr. John R. Campbell, Regional Director, War Assets Administration, 40 Wall Street, New York 5, N. Y., reading as follows:

DEAR MR. CAMPBELL: The port authority is deeply indebted to your agency for its invaluable cooperation in expediting the execution and delivery of the surrender of the Government's lease of Newark Airport. Without the assistance of your agency, the prompt commencement of the port authority's operation of Newark Airport and seaport could not have been realized.

Mr. Harry Milnes and his staff were specifically helpful, and I should like to convey our appreciation to them through you.

I am looking forward to an opportunity to express my thanks personally on March 31. I understand that you and Mr. Milnes will be honored guests at the luncheon which the Newark Chamber of Commerce has arranged at the Robert Treat Hotel in Newark at 12:15 p. m. on that day, to commemorate the return of Newark Airport to civilian use.

The port authority has taken a number of tables for this event and I hope that Messrs. Kenney, Larkin, and Neiman of Mr. Milnes' staff will be able to accept our invitation to join us there.

Sincerely yours,

AUSTIN J. TOBIN, *Executive Director.*

Then there is another document which you may have placed on the record, but I will read it into the record now:

CITY OF NEWARK, DEPARTMENT OF PUBLIC AFFAIRS, JOHN A. BRADY, DIRECTOR: CERTIFIED COPY OF A RESOLUTION ADOPTED BY THE BOARD OF COMMISSIONERS

Whereas the city of Newark, as landlord, leased unto the United States of America, as tenant, property located in Port Newark in the county of Essex and State of New Jersey under a lease agreement dated April 1, 1942, and which lease agreement has from time to time thereafter been modified by supplemental agreements; and

Whereas the terms of said lease agreement as so modified do not expire until 6 months after the termination of the presently existing state of national emergency as declared by Presidential Proclamation No. 8487 dated the 27th day of May 1941, unless sooner canceled and surrendered by the United States Government; and

Whereas the effective date of the lease agreement made between the city of Newark as landlord and the Port of New York Authority as tenant dated October 22, 1947, whrein the city has leased the sea terminal and air terminal at Port Newark, means the date of the surrender, cancellation, or other termination of said lease with the United States of America; and

Whereas the United States of America has at this time designated its willingness to enter into an agreement with the city of Newark for the purpose of surrendering, canceling, and otherwise terminating said lease agreement so made with the city of Newark and dated April 1, 1942; and

Whereas it becomes necessary at this time to accept the surrender, cancellation, and termination of the lease with the United States of America in order to make effective the lease between the city of Newark and the Port of New York Authority: Now, therefore, be it

Resolved by the Board of Commissioners of the City of Newark, That the director of the department of revenue and finance, and the city clerk, are hereby authorized and directed, on behalf of the city of Newark, to enter into the necessary agreement or agreements, after the same be first approved by the law department of the city of Newark, for the purpose of securing the necessary surrender, cancellation, or other termination of the lease agreement so entered into by the city of Newark as landlord, and the United States of America as tenant, dated April 1, 1942, and the several supplemental agreements relating thereto.

VINCENT J. MURPHY,
M. ELLENSTEIN,
JOHN A. BRADY,
Board of Commissioners of the City of Newark, N. J.

Now, I offer these communications for the record. They were handed to me by the chairman of our committee previously.

Mr. KLEIN. The documents will me received in evidence and marked "Exhibit C–1."

(The items referred to were marked "Exhibit C–1" and made a part of the committee files.)

Mr. HINSHAW (continuing). Now, coming back to the question of the outstanding bonds, totaling about $17,990,000, approximately, I don't know whether you know or have knowledge as to what the service charge is on that amount or when they are due or anything of that nature.

Mr. TOBIN. No; but I do know where it is available. You can get that for the record later, if you wish.

Mr. HINSHAW. But, at all events, you believe that the release from the loss incurred by the city of Newark, and your taking that operational loss over, and I believe you stated that you have lost over a million dollars plus the $100,000 annual rental, as well as your agreement to spend $70 million in the improvement of the airport and seaport facilities, and your agreement to turn that back to the city of Newark was a fair settlement in the leasing of the facilities?

Mr. TOBIN. Definitely.

Mr. HINSHAW. And it will be turned back to the city of Newark in 50 years?

Mr. TOBIN. It cannot be more than 50 years. If the bonds are paid off by a shorter date, it will be a shorter time that we will turn it over, but we may not issue bonds that mature more than 50 years after the original date of the signing of the lease.

Mr. HINSHAW. And whether or not you are able to develop a profit from the operation of the facilities, you must keep up the service of these bonds and pay the city of Newark a rental fee of $100,000 a year?

Mr. TOBIN. Yes.

Mr. HINSHAW. I believe you previously stated that in the event the operation of the facilities results in a profit, you will pay the city of Newark 75 percent of the net profit.

Mr. TOBIN. Yes.

Mr. HINSHAW. Is that in addition to the $100,000 or in lieu thereof?

Mr. TOBIN. Whichever is the greater, the 75 percent of the net profits or the $100,000.

Mr. HINSHAW. In the original proposal, was there any statement made as to an anticipated date when the 75 percent of the annual net revenues might exceed the $100,000 rental fee?

Mr. TOBIN. I don't believe so. We told them that it would be a long, long pull, and that we didn't look forward to realizing a profit inside of 17 or 18 years from the time we took over.

Mr. HINSHAW. There is another matter in connection with the lease that to me is quite serious, although I do not have the lease before me, but maybe it can be explained, and that is, as a part of the consideration of the lease, you agreed to acquire additional land in the city of Elizabeth and I assume that includes city streets in the city of Elizabeth.

Mr. TOBIN. Yes.

Mr. HINSHAW. What puzzles me, Mr. Tobin, is how you could expect to carry out the provisions of the lease with that term in it when the law requires that you have to have an agreement between the city of Elizabeth—or for that matter any municipality—to acquire land from it? I am curious to know how you could consummate the lease with the city of Newark when you had not yet obtained the consent of the city of Elizabeth to acquire any land from them.

Mr. TOBIN. Our action at that time was based on the belief that the city of Elizabeth would be cooperative in the general development of that airport. We believed it at that time, and the city of Elizabeth could have blocked that expansion completely.

Mr. HINSHAW. Well, if the city of Elizabeth had blocked the expansion, would that have voided the lease?

Mr. TOBIN. No.

Mr. HINSHAW. In other words, that was a contingency hoped for and anticipated, but not a requirement of the lease to make it official?

Mr. TOBIN. That's correct.

Mr. HINSHAW. Thank you, sir.

Mr. KLEIN. The bonds issued by the Port of New York Authority are issued, I assume, against each operation. In other words, the bonds would be issued as against the Newark Airport?

Mr. TOBIN. The bonds of the port authority—most of the bonds are what we call general and refunding bonds and they are issued against the direct revenues, as well as a pooling of all the principal outstanding facilities; that is, the railroad terminals in New York, the motor-truck terminals, are all in the pool of the port authority general and refunding bonds, and when we tell you—when we sell you these bonds, we tell you it is backed by all of them. However, when we tell you it is an airport bond, it is only backed by the port authority, and back of that is the general pool of revenues of all of the port authority itself.

Mr. KLEIN. Then the person who bought the bonds of the airport, if the airport loses money, nevertheless, the bondholder would get his interest if the other properties are making enough to pay the interest?

Mr. TOBIN. Yes.

Mr. KLEIN. Are you losing money at LaGuardia Airport at the present time?

Mr. TOBIN. Yes.

Mr. KLEIN. Thank you.

I have some questions here from Mr. Case in writing, and he would like to have me submit these questions.

The first one is: The public is very anxious to know upon whom the responsibility rests for the operation of the Newark Airport. Cannot the port authority stop the movement of its expansion of the airport if the city of Newark consented?

Mr. TOBIN. The port authority is committed to go forward with the expansion program, not only in its obligation to the city of Newark, but to the bondholders, the airlines, and Federal Government. That is the answer to the question, and it involves an answer that I gave awhile ago to Mr. Hinshaw. The ramification of obligations arises out of the lease and those obligations are to all these other agencies. I would question, as a matter of law, whether the port authority could properly stop the development of the general basic plan.

Mr. KLEIN. Although originally I stated that the questions submitted by Mr. Case would be handled through the Chair, I think it would be more convenient and satisfactory for Mr. Case to ask the questions directly. I am certain the members of the committee would have no objection to that.

Suppose, Mr. Case, you go ahead and ask your questions.

Mr. CASE. Mr. Tobin, you say that you do not believe the port authority could properly stop the development of the basic general plan?

Mr. TOBIN. That's correct.

Mr. CASE. Even if the citizens or residents of the areas objected?

Mr. TOBIN. Yes.

Mr. CASE. Well, Mr. Tobin, the port authority did close it on February 11. What was the authority for doing so on that date?

Mr. TOBIN. That was a temporary closing. We frequently close the runways when it is a question of having them repaired. On 3

o'clock in the morning on February 11 we thought it prudent, until everyone had an opportunity to examine the question, to close the airport.

Mr. CASE. Actually, the airport is closed to all planes, is it not?

Mr. TOBIN. Yes.

Mr. CASE. Is it true that the port authority had no control over its runway on flight 24?

Mr. TOBIN. Mr. Glass can discuss that.

Mr. KLEIN. Is it all right to wait until Mr. Glass testifies on that question?

Mr. CASE. Yes. Mr. Tobin, is there any existing agreement where the United States or the military have the right to use the port-authority centers?

Mr. TOBIN. Yes; under the Federal-aid program.

Mr. CASE. Without anybody's consent?

Mr. TOBIN. Yes; so long as the runways are open.

Mr. O'HARA. But the Government could take it over, anyway.

Mr. TOBIN. The runways are open for the military authorities.

Mr. CASE. What if the great majority of residents of adjacent areas oppose the airport?

Mr. TOBIN. I think that is a question which everyone involved should resolve. I think that our problem and our duty is to satisfy the people of this whole metropolitan area that the airport is safe.

Mr. CASE. Wouldn't the port authority consent to end its expansion plan if it were demonstrated that this is objectionable to a great many residents of the area?

Mr. TOBIN. That seems to be a very "iffy" question. Our problem is to satisfy the people of the whole metropolitan area and not just one section.

Mr. KLEIN. That seems to be an "iffy" answer, too.

Mr. CASE. Despite the work already done and the money already spent on the expansion program for new developments, there has been a substantial increase in the risks to the adjacent areas. That being so, should not this program be reviewed again?

Mr. TOBIN. Oh, yes.

Mr. CASE. And you certainly would take that into consideration as to what action should be taken?

Mr. TOBIN. Yes.

Mr. CASE. It is assumed that on completion of the new runways, only relatively small percentages of traffic will take off or depart from runway 24.

Mr. TOBIN. You mean take off or land.

Mr. CASE. Yes.

Mr. TOBIN. Mr. Glass will cover that very carefully.

Mr. CASE. Why were these percentages of take-offs and landings estimated? Why isn't it certain?

Mr. TOBIN. The amount of landings and take-offs in any airport—all we can do is to estimate because the actual governing of the take-offs and landings of planes is a matter for the CAA and also a decision for the pilot to make and others, so it would be impossible to do anything but estimate.

Mr. CASE. Why can't the port authority absolutely say "No" to any landings or take-offs that they might consider unsafe?

Mr. TOBIN. Do you mean for the port authority to say "No" to the CAA?

Mr. CASE. I mean anybody who wants to land or leave.

Mr. TOBIN. That is the particular responsibility of the Federal agency which was created under the law to handle just that situation. That is not a responsibility of the port authority. If there is any violation regarding an excessive number of landings or take-offs, that is not our responsibility. That is the responsibility of the CAA, which makes the rules. All we are is garage people. We don't have anything to say as to how these planes shall come in or go out. That is entirely a matter for the CAA.

You will notice in the statement issued by the CAA, as set forth in Mr. Sly's report, and I quote:

> The CAA will do everything within its statutory power to enforce the observance of runway priority for take-offs which have already been recommended by a joint committee of airlines, the Airline Pilots Association, the CAA, and the port authority. These priorities apply to both LaGuardia and New York International and provide for the utilization of runways at these two airports which permit take-offs over water or the most sparsely settled areas as a matter of first choice. Under these plans, runways requiring operation over congested areas would be utilized only when such is mandatory for reasons of safety. It is anticipated that this procedure will substantially reduce the volume of operations over congested areas in the vicinity of these two airports.

Now, Administrator Charles Horne, of the Civil Aeronautics Administration, made that statement at a meeting attended by representatives of the CAA, the CAB, the port authority, the Airline Pilots Associaion, and others. Everyone was there in conference and the only person who could say that is the Administrator of the CAA. He has the jurisdiction; we do not. It is not up to us to usurp the prerogative of the accredited and authorized Federal agency in such matters.

Mr. KLEIN. Does the Administrator of the CAA have to listen to the port authority?

Mr. TOBIN. We have always found them very cooperative and when we have suggestions to make they have always listened to us. However, it is still a matter for their jurisdiction and not ours.

Mr. KLEIN. What Congressman Case is trying to get to is this: Have you ever told the CAA that you positively didn't want them to do something with regard to taking off from one of your airports—is that what you are trying to bring out, Mr. Case?

Mr. CASE. I won't press the question because I know how the people in this area feel about it and the difficulty of pinning the responsibility on any one individual. There has been created in the minds of the people in this area that they are in the grip of something that cannot be stopped. Obviously, it can be stopped, but the specific question that I want directed to Mr. Tobin at this point is, Cannot the port authority refuse to permit a specific pilot to use a specific runway at a specific time?

Mr. TOBIN. This is a public terminal facility and any aircraft operator may use it, as I understand the interstate commerce law, provided he observes the rules and regulations of our Federal agency which deals with that operation, which in this case is the Civil Aeronautics Administration.

Mr. CASE. Mr. Tobin, may I put it this way: Are you obliged to maintain in operation a runway which points to a congested area if

that runway—can you not or don't you have the authority to prevent a runway which points toward a congested area being used?

Mr. TOBIN. Again I must point out that the question of whether or not it is a safe runway is a question specifically dealt with by the CAA. The question as to whether or not it is a safe runway can better be determined by the CAA because they are better qualified to make that decision. That is their business. We rely upon their judgment as to the safety of that or any other runway and it is not for us to take it upon ourselves to say any runway is unsafe. We would not argue about it; we would close it.

Mr. CASE. That is begging the question, Mr. Tobin—bringing up a negative point.

My question is, Would you yourself have the power to close any runway that points to a congested area?

Mr. TOBIN. I don't believe that the port authority or any other airport operator has the right to maintain a public airport and try to make rules for the landings and take-offs of aircraft which is the proper jurisdiction of the Federal Government or the agency that the Federal Government has designated to make those rules and regulations.

I may say, on the other hand, that I cannot imagine that in some extreme case that if the operator's common sense told him it was not safe for the airport to be kept open, that he wouldn't try to bring that to the attention of the proper authorities, but, nevertheless, it would not be the duty of the operator of the airport to close that runway. Probably he would do it but that is not his prerogative.

Mr. CASE. When you say specifically that you would not ordinarily close the runways or the airport in case a situation arose where you felt it was unsafe, except in an extreme emergency, do you embrace, not only the safety of the operator of the aircraft, as well as the aircraft itself, but the place over which the plane would have to fly?

Mr. TOBIN. No; any place that an airplane flies might be considered unsafe.

The mere fact that a railroad or an automobile has an accident—the fact that an automobile may go off the road doesn't mean that automobiles must be kept off the road.

Mr. CASE. That is exactly the question I am trying to arrive at. Do you have no responsibility for the safety of the people in the adjacent areas?

Mr. TOBIN. In the sense that you put the question, I would say we have, but if you mean the people in the same sense as the people of Atlantic City or Belmar or Washington, if that plane came from our airport and crashed over one of those cities, in that sense we have no responsibility.

Mr. CASE. We are not trying to do anything to establish responsibility in any particular case to your airports or runways, and only the best spirit animates all of us, but if it is not the responsibility of the operator of the airport—in this case the port authority—to take into account the safety of the adjacent areas, then whose responsibility is it, Mr. Tobin?

Mr. TOBIN. The direct responsibility of the CAA.

Mr. CASE. Does the CAA consider itself the person or organization solely responsible for determining the safety of the adjacent areas?

Mr. TOBIN. It certainly considers itself responsible for the public service in the air.

Mr. CASE. Isn't it different in air flying and in flying to and from an airport? For example, the CAA has a regulation covering the height our planes must fly above a certain obstacle.

Mr. TOBIN. We have to have all sorts of rules about obstructions at the airports because the plane is quite low at the time.

Mr. CASE. Just to be sure that there is no misunderstanding because people are very much concerned about that and I don't want a false impression to be created, do you know that you have responsibilities in connection with the location and expansion of any airport under your control for the safety of people living in adjacent areas?

Mr. TOBIN. I can only say to you that in this and every other airport, the responsibility is all on the Federal agency created by the United States Government for that purpose—created by your Congress. The Federal laws have designated the CAA to exercise that jurisdiction and authority and any time an operator of an airport tries to trespass upon their jurisdiction and prerogatives and their exercise of the control power, that operator would very quickly and properly get his knuckles rapped by the CAA.

Mr. CASE. I was particularly concerned with the creation of new facilities and closing existing facilities. What is your responsibility to people in adjacent areas?

Mr. TOBIN. I think your question is so very, very general that I really would not attempt to answer it. Our responsibility for opening any new airport or maintaining an existing airport or closing it—our responsibility is restricted to constructing good runways with the approval of the CAA. If they think the runway is safe, we take it for granted it is safe. However, I do not say that an accident may not happen in spite of that.

Mr. CASE. Then it is your feeling that it is not your responsibility.

Mr. TOBIN. If the CAA or the CAB certify the construction of certain runways or their continuance, it is certainly not our responsibility if anything happens.

Mr. CASE. I think that is all.

Mr. O'HARA. I have some questions that run along the line of the questions that Mr. Case has been asking.

Take the practical operation of your airport here. Does the port authority have any control of the planes going in or coming out of the airport?

Mr. TOBIN. That is all handled by the CAA employees.

Mr. O'HARA. They tell the pilot where he is going to land and on what runway?

Mr. TOBIN. Yes.

Mr. O'HARA. They are, at least directly or indirectly, responsible for the safety of that plane?

Mr. TOBIN. Yes, sir; and Mr. Glass will handle that in detail when he testifies. He will take a plane on an imaginary flight and tell us whose responsibility is involved and the rules of the route.

Mr. O'HARA. And in the operation of the three airfields, you have no way of knowing whether planes bound for Idlewild, because of poor weather conditions, may be routed to this airport here?

Mr. TOBIN. That is correct.

Mr. O'HARA. And vice versa?

Mr. TOBIN. We don't know anything about their relations. That is entirely without our control.

Mr. WOLVERTON. Do the airlines that operate in and out of your airport do so by reason of any agreement with you?

Mr. TOBIN. Yes, they have a lease with us.

Mr. WOLVERTON. Did you take over the leases that had been entered into by the city of Newark at the time you took over the operation of the airport?

Mr. TOBIN. Yes.

Mr. WOLVERTON. So that you are, in a sense, bound by what was done before you took over?

Mr. TOBIN. We are operating under the continuance of this lease, all of which was contracted by the city of Newark. I said "this lease", I mean we are operating under the continuance of those leases, all of which were contracted by the city of Newark.

Mr. WOLVERTON. When did Commissioner Ellenstein make his objections?

Mr. TOBIN. As soon as it was taken over by the port authority. He was championing it down to the time it was suggested that the port authority take it over and he was opposed to it and has been opposed to it since that time, until the time the lease was made.

Mr. WOLVERTON. He made pretty strong statements to this committee with respect to the closing of this airport, from the standpoint of safety, as well as noise. Had he taken that position at any time, to your knowledge, before the airport had been taken over by the Port of New York Authority?

Mr. TOBIN. At no time before then had he taken that position except the year before the agreement was made. He was arguing against the lease.

Mr. WOLVERTON. Did he also make an argument to maintain the airport as a mail delivery point?

Mr. TOBIN. Yes.

Mr. WOLVERTON. Was that before or after the New York Port Authority took over?

Mr. TOBIN. That was before; that was in 1941—1940 and 1941.

Mr. WOLVERTON. That is all.

Mr. KLEIN. Your next witness is Mr. Glass.

Mr. TOBIN. Yes, sir.

Mr. KLEIN. Your name and address, please, for the reporter.

STATEMENT OF FRED M. GLASS, DIRECTOR OF AVIATION DEVELOPMENT, PORT OF NEW YORK AUTHORITY

Mr. GLASS. Fred M. Glass, director of aviation development of the Port of New York Authority. My address is 118 Eighth Avenue, New York City.

Mr. KLEIN. You may proceed, Mr. Glass.

Mr. GLASS. Mr. Chairman, members of the committee, the background of the port authority's assumption of responsibility for the operation, maintenance, and development of Newark Airport has previously been related to the committee by Commissioner Sly and Mr. Tobin.

I would like at this time to supplement their statements with additional data relating primarily to the planning, economic, and opera-

tional aspects of Newark Airport's development subsequent to the authority's assumption on March 22, 1948, of responsibility for the financing, development, and operation of the airport under contract with the city of Newark.

I would, however, first like to add a few facts with respect to the facility itself. This field, as you know, is one of the oldest and best known airports in commercial aviation, dating back to the late twenties, when commercial aviation itself was just beginning that era of its career now commonly referred to as its infancy. The site for the field was selected by the Hoover Fact-Finding Committee in 1927. Development and financing of the airport was immediately undertaken by the city of Newark, with the constant assistance, from design, operational, and financial standpoints, of the State of New Jersey and the Federal Government.

The investments in this airport from the date of its initial construction until it was turned over to the authority in 1948 totaled $23 million, of which amount approximately $8.2 million was contributed by the city of Newark, approximately $15.1 million by the Federal and State Governments, and approximately $400,000 by private investors.

Its operation and development continued to keep pace with the growth of commercial aviation until, by the middle thirties, it was the principal airport for metropolitan New York-northeastern New Jersey area, and statistics indicate that at that time it was one of the busiest airports in the world.

Mr. Tobin has related to you the manner in which the city of Newark aggressively fought the designation of LaGuardia Field in 1938 as a competitive commercial airport in the New York area, and supported Newark Airport's future development as one of the major air terminals of the United States up to the time of the transfer of responsibility for its financing and development to the port authority in 1947 and 1948.

Shortly after the break-out of World War II—April 2, 1942—the field was taken over by the United States Government and became an important Air Force base as well as a vital adjunct to the military's overseas shipping installation at the Newark seaport.

During the next several years the military hard-surfaced the city's three runways on this airport. One runway, known as 1–19, was 4,850 feet in length, with an alinement of 10°—190°; the second, known as 10–28, was 6,050 feet in length with an alinement of 100°—280°; and the third, known as 6–24, was 6,600 feet in length with an alinement of 60°—240°. All of these runways were 150 feet in width, were macadam-surfaced and were stressed to bear aircraft weighing about 60,000 pounds.

The field received very heavy usage both during the war and for approximately 3 years thereafter, 1945 to 1948, when it was again under the jurisdiction of the city and operated as a civil airport.

When the authority assumed jurisdiction of the airport, its runway facilities were in very bad need of repair and were described in an authority engineering report in the following manner:

> The original runways constructed by the city of Newark were built upon filled marshland. Since they were not "contained" against spreading of the soft material which underlies them, they have been subject to settlement even under the impact of the relatively light planes in use during the prewar and

war periods. Careful engineering tests have indicated that the surface life of these runways would be severely limited unless their use is restricted to planes of less than 45,000 pounds gross weight.

When Newark Airport was taken over by the Army Air Force, large expenditures were made for extending the runways and taxi strips, but even the extended sections are rated for continuous service only by planes under 60,000 pounds gross weight.

Since the modern commercial transport exceeds 45,000 pounds, and larger models such as the *Constellation* type exceed 60,000 pounds are already in service, the existing runways have a service life or not more than 5 years under continuous use. It will then be necessary to spend large sums for heavy maintenance and eventual rebuilding, if the airport is to be operated as first-class commercial field.

At this time I would like to submit as an exhibit a map of the Newark Airport as it exists today.

Mr. KLEIN. The map will be received in evidence and marked "Exhibit PA–23."

(The item referred to was marked "Exhibit PA–23" and made a part of the committee files.)

Mr. GLASS. Also at this time I would like to submit a copy of the report from which I have just read.

Mr. KLEIN. The report referred to by Mr. Glass will be received in evidence and marked 'Exhibit PA–24."

(The item referred to was marked 'Exhibit PA–24" and made a part of the committee files.)

Mr. GLASS. The principal operational facilities on the field at the time the authority assumed responsibility for the airport consisted of eight hangars, a number of other buildings in the northeastern portion of the field under lease to the New Jersey National Guard for a period of 50 years from 1928, and a terminal building located on the northeastern side of the field.

The authority's detailed survey, review, and analysis of this airport confirmed that the runways, taxiways, and terminal buildings were completely obsolete and that, in order to modernize the field, it was essential, among other things, that a new runway system be designed and constructed, new terminal facilities developed, and that ancillary operational installations, and so forth, be provided.

It would appear pertinent at this point, before considering further the physical planning, construction, and so forth, of the authority at the airport, that consideration be given to the role of Newark Airport as a transportation facility in this great metropolitan area. Basic to such consideration is a study conducted by a staff of consultants of the authority in 1949 and 1950 for the purpose of ascertaining the volume of air traffic—that is, passenger, cargo, and mail—that will be generated by this area over the next 30 years, in order that facilities required to handle such traffic can be most logically determined, planned, financed, and constructed. This report was prepared by as eminent a group of authorities in the field as could be assembled.

It is clear from even the most casual analysis of the foregoing and from a survey of the physical characteristics of industry, population, and resultant congestion in this metropolitan area that this tremendous public demand for transportation can be met only through a regional system of airports located so as to assure ready accessibility of such facilities to the various parts of the port district.

It is equally clear from an operational standpoint that no single airport, regardless of size or regardless of efficiency, could possibly

handle this great demand for air transportation. One need but review the population, physical, and other characteristics of this area, a map of which I herewith submit for ready reference, to clearly see the necessity for large modern airports physically situated so as to provide service to all parts of the port district. I offer this map as an exhibit.

Mr. KLEIN. The map will be received in evidence and marked "Exhibit PA-25."

(The item referred to was marked "Exhibit PA-25" and made a part of the committee files.)

Mr. GLASS. With the existent ground congestion in this area, it is physically impossible to provide service to the millions of people in Brooklyn and Long Island through an airport or airports situated in New Jersey and, similarly, it is impossible to provide transportation to the millions of people residing and doing business in northern New Jersey through an airport or airports located in the eastern extremity of Queens.

The policy of regional airport development typified by New York International, LaGuardia, Newark, and Teterboro Airports is clearly the only manner in which facilities adequate to handle the air-transportation demands of this area above described can be provided which will meet the requirements of the various portions of this metropolitan area and at the same time operationally meet the needs of the required heavy volume of traffic.

After determination of the future air-traffic requirements of the port district, the next step logically to be taken was the determination of the portion of the previously stated volume arising out of the very considerable demands of northern New Jersey which must be served through Newark Airport. That passengers and shippers of northern New Jersey were placing reliance upon air transportation at a rate commensurate with—and in many cases exceeding the Nation as a whole—is clearly reflected in the growth to date of air traffic in this metropolitan region.

Predicated upon the foregoing, upon detailed data embraced within the authority's traffic study, and upon the best information obtainable from those charged with the establishment of schedules, selection of type of aircraft, and determination of seating capacity and so forth, it was our considered opinion that Newark Airport will ultimately be required to handle approximately 15 percent of the short-haul traffic—that is, traffic moving for distances of less than 1,000 miles—into and out of this area, and 30 percent of the long-haul traffic, that is, traffic moving in excess of 1,000 miles. The rapidly growing reliance of New Jersey industry on air transportation led to the further conclusion that Newark would continue to be the dominant cargo airport, not only in the port district but on the eastern seaboard. The provision of facilities adequate to handle the above-stated transportation needs of the area with the type of aircraft indicated for future development and operation form the basis of the authority's tangible planning at Newark Airport.

Having previously described the very inadequate condition of Newark Airport at the time the authority assumed responsibility for its operation in 1948, I would at this time like to review briefly with you the improvements which have been accomplished, are now in the process of being accomplished, or are planned for the future in order

to provide facilities required in the northern New Jersey area as a part of the regional terminal airport facilities I have previously described.

In the interest of the committee's time, I will comment in some detail only on the two principal parts of this very considerable improvement program, that is, the runways and the passenger terminal building. Before doing so, however, I would like to list the following items and the approximate cost of each, which in total comprise the projects completed or committed by the authority to December 31, 1951:

Land and land improvements, $4,205,521; utilities, $187,512; roadways, $521,257; landing area and aircraft parking facilities, $11,769,331; traffic control tower, $69,718; vehicle parking lots, $41,639; hangars and buildings, $537,581; present terminal, $182,286; new terminal, $6,452,814; miscellaneous, $435,085; total $24,402,744.

First, let us consider the runways. Thoroughgoing analysis extending over a considerable period of time and involving continued consultation with every segment of the aviation industry and responsible agencies preceded the decision in 1948 to proceed with the prompt construction of new runways. Factors that were weighed in reaching the determination with respect to the design of these runways were (1) alinement with respect to physical obstructions and hazards in the area; (2) alinement so as to avoid, in the maximum possible degree, such residential and industrial areas as lie in the vicinity of the airport; (3) alinement with respect to prevailing wind directions; (4) alinement with respect to instrument runways at LaGuardia and New York International Airports in order to assure maximum safety of air traffic, particularly under instrument conditions.

After exhaustive analysis, it was determined and recommended that the master runway lay-out of the field comprise two sets of parallel runways designated A and B in a northeast-southwest direction and C and D in an east-west direction. Such a master plan, among other things, permitted the designation of an instrument runway parallel to the instrument runways at LaGuardia and New York International; and availability of approaches to the instrument runway providing, not only the maximum clearances by the CAA, but avoiding in very substantial degree residential and industrial areas in that direction—in either direction.

It was accordingly determined that runway A shown on the attached map, which I offer as an exhibit at this time, would be given first priority and that upon its completion it would be designated as the instrument runway.

Mr. KLEIN. The map showing the existing runway will be received in evidence and marked "Exhibit PA–26."

(The item referred to was marked "Exhibit PA–26" and made a part of the committee files.)

Mr. GLASS. The present instrument runway 6–24 alined toward the city of Elizabeth would be abandoned as soon as runway A was in operation.

As will be noted on the map, a view of the attached map will reflect that runway A, which will be 7,000 feet long, with an alinement of 40°–220° magnetic, is situated immediately adjacent to the New Jersey Turnpike on the easterly edge of the airport and will permit ap-

proaches over the Arthur Kill and marshlands from the south and over the Kearny meadows and the industrial section of Newark from the north.

Exhaustive analysis of wind conditions at Newark Airport over a period of many years, the graph of which I would like to submit to the committee for the information of the committee, revealed that with a cross-wind component of 15 miles per hour, runway A could handle aircraft within the operating limitations prescribed by the CAA for approximately 92 to 94 percent of the time. I offer this graph of wind observations based on a period of years as an exhibit.

Mr. KLEIN. The graph will be received in evidence and marked "Exhibit PA–27."

(The item referred to was marked "Exhibit PA–27" and made a part of the committee files.)

Mr. GLASS. Pursuant to the airport legislation referred to before, the port authority is required to submit all plans for construction wherein Federal aid is to be furnished, to the Bureau of Aeronautics of the Department of Conservation and Economic Development of the State of New Jersey for approval and processing.

In December of 1949, that Bureau approved the construction plans for the fill of runways A and D and adjacent taxiways and in January of 1952 approved the construction plans for paving of runway A and its adjacent taxiway. A drawing showing the glidepaths to both ends of the runways A and D were included in the various drawings and plans forwarded to and approved by the Bureau of Aeronautics.

In accordance with the foregoing operational decisions, a contract for the design of the runways at Newark was given on March 1, 1949, to Carrillo & Green, consulting engineers for New York International Airport for the city of New York and the Port of New York authority. They, in turn, secured the services of Mr. O. J. Porter, one of the world's leading soil consultants. After obtaining detailed subsurface data on the alinement of the proposed runways, which consisted of borings taken by the port authority soils laboratory during the period of January to September 1949, he recommended that (1) sand drains be placed through the meadow mat to expedite the settlement of the compressible material; (2) the elevation of the runways be established at 308 port authority datum, which is generally 10 feet above the original surface area, and (3) sufficient overload be placed upon this datum to assure that future settlement on the runways would be reduced to a practical minimum and that any subsequent settlement would be uniform throughout the runways. This overload varied from 14 to 16 feet, depending on its location.

Upon receipt of Mr. Porter's recommendations, contract drawings for the sand fill, sand drains, and culverts were commenced September 1, 1949. The contract for placing 3.3 million cubic yards of selected fill material and driving 740,000 linear feet of vertical sand drains, as well as the construction of two large culverts and other related work was advertised in December 1949, and awarded shortly thereafter.

An analysis of laboratory settlement curves indicated that the fill should be placed in a definite sequence and pattern to secure the desired settlement. This limited the amount of fill that could be placed at any one time and necessitated long waiting periods between the various lifts of material to effect the maximum settlement of 4½ feet.

Because of the specifications of the fill material, it was necessary to

dredge sand from the bottom of Jamaica Bay and to transport it by barge to Newark Airport. Filling operations were commenced on March 17, 1950, but because of the above-mentioned long settlement periods, the contractor established the date of completion of fill as of July 1, 1952.

During the fall of 1951, the drainage and lighting and paving of runway A was designed and the contract was let for this work in January 1952. Experimental tests are currently being conducted on paving to determine the actual thickness of the runway itself.

Although the construction of this runway has been pushed at the most rapid rate possible, consideration was again given a few weeks ago to the speed with which this runway can be completed. The report of the chief engineer of the authority, after exhaustive examination of this potentiality reflects the following fact upon which the conclusion that this runway will be available for operation by November 1, 1952, is based, and I quote:

> Investigations were made to determine if the subgrade for the runways could have been prepared sooner than required by present schedules. The accelerated schedule would require closer-spaced sand drains, increased depth of surcharge, decreased waiting period between lifts, and a reduction in the settlement time after the surcharge has been placed. Such a procedure would require a calculated risk on not only the ultimate settlement of the runway but, of much more importance, the uniformity of this settlement. The existing runways are a very vivid example of what differential settlement can do to runway grades. The present runways were constructed under emergency conditions that would not allow the placement of adequate surcharge or the required settling time for the desired compaction of underlying compressible material.

Runway D, which also requires very extensive fill and settlement operations prior to completion of the runway, cannot be available for operation, according to present estimates, prior to the late summer of 1953.

Next, let us consider the construction of the much-needed passenger terminal building. As can be readily seen from the attached exhibit showing the alinement of runways A and D, the location of the permanent terminal building providing quick access to all of the runways is clearly reflected as being in the central area—that is, between the runways. Because of the condition of the soil in this area, economic studies reveal that such construction would cost between $20 and $25 million and that the operation of such facility at this time would result in operating losses of a staggering nature.

The decision was accordingly made that a temporary terminal building would be constructed outside the central terminal area, designed so as to permit its being utilized for commercial purposes for many years and as a passenger terminal building for a limited number of years. In accomplishing this objective, plans were prepared for a permanent-type building on the northern side of the airport between the Brewster hangar and the present terminal building, designed so as to permit its use for varied commercial purposes for a normal 40-year life, but including facilities necessary for its operation as a passenger terminal building for a 10- to 12-year period.

The contract for the construction of the foundations on this building, which will comprise a total area of approximately 150,000 square feet, was let on December 11, 1951—rather, September 11, 1951—and has been completed. It is estimated that the completion of the facility

will require approximately 13 months of construction subsequent to obtaining the necessary steel.

The need for the foregoing facility is clearly indicated by the fact that the present terminal building contains only 30,000 square feet of usable space and was constructed in 1934 at a time when traffic volume at Newark totaled only a little over 123,000 passengers per year as compared with a total of 1,355,173 passengers in the year 1951.

Long before the decision to proceed with the construction of runway A, runway D and the new passenger terminal building, the authority consulted in detail with the Civil Aeronautics Administration and made application to the Administrator for the approval of grants under the Airport Act to assist in the financing of these very costly facilities. The construction of both the runways and the terminal building met with the approval of the Civil Aeronautics Administration and over a period of 3 years the CAA has entered into grant agreements with the port authority totaling $4,671,930 as assistance in the financing of the facilities. Such grant, as I have said before, and in accordance with airport statute, passed through the hands of the State of New Jersey, which has designated the office of the commissioner of the department of conservation and economic development to consider and approve such projects on behalf of the State. Detail of these Federal grants follow:

Project 9–28–009–801, 1949, miscellaneous paving and drainage; grant offer $125,000; final payment $31,700 utilized. PA Contract No. NA–3.

Project 9–28–009–902, 1949, preparation of land for new runways and taxiways; grant offer $1,075,000; payment $346,658.40 utilized. PA Contract No. NA–25.

Project 9–28–009–003, 1950, preparation of land for runway A by fill and culverts; grant offer $1,171,930; payment $967,607.40 utilized. PA Contract No. NA–25.

Project 9–28–009–104, 1951, new passenger terminal; grant offer $1,500,000; no payment. PA Contract Nos. NA–31, NA–170.034, NA–170.035.

Project 9–28–009–205, 1952, removal of surcharge, paving and drainage of runway A, taxiway T–2 and connecting taxiways; grant offer $800,000; no payment. PA Contract No. NA–220.002.

The foregoing grants total $4,671,930.

In carrying out its responsibilities for provision of navigational aids and so forth, the Civil Aeronautics Administration over the last several years has installed or committed the following facilities at Newark Airport:

Ground control approach: Type MPN–1 (former Air Force unit housed in trailer) was moved from La Guardia to Newark Airport and commissioned April 4, 1951. New surveillance radar (Type ASR–2) has been installed and is undergoing engineering tests by the manufacturer, General Electric, before commissioning. New precision approach radar (Type PAR–2) has been ordered by the CAA from Bendix and installation is scheduled for next winter. This unit will provide radar coverage for the southwest approach to runway A.

Instrument landing system:

Equipment developed and installed under CAA contract was commissioned March 20, 1947.

Approach lights:

Left-hand row of high wattage lamps installed and commissioned November 17, 1947, later converted to high-intensity lights. Centerline system (sponsored by ALPA) installed and commissioned March 29, 1951. Tigh-intensity lights plus condenser discharge lamps showing flashes in sequence from outer end toward the runway. Both types extend 3,000 feet southwest from the end of the runway. The ALPA centerline system is the one now being used in the United States and

that has been put to considerable review and certified by airplane officials throughout the world.

Control tower:

Weather reports are received instantaneously over telautograph from the Weather Bureau observer in the administration building. Tower has a standard altimeter setting indicator from which current altimeter settings are given to the pilots.

During this same period the port authority, as the operator of the airport, installed high-intensity runway lights on both sides of the instrument runway spaced 100 feet apart for 1,600 feet from the southwestern end of the runway, and 200 feet apart along the rest of the runway and installed a Sperry modified Calvert system centraline runway marking and wide line strips. This latter system includes threshold markings and distance markings every 500 feet.

In an effort to ascertain the comparative status of Newark Airport with respect to the proximity of Newark Airport to surrounding residential and business areas, a list was obtained from the Civil Aeronautics Board records of the first 100 airports in the United States in terms of traffic volume. Official maps of the Civil Aeronautics Administration, prepared by the Coast and Geodetic Survey, of these 100 airports showing the airport and adjacent areas, were then studied in detail and measurements taken of the distances between runways and the nearest congested areas shown on all such maps.

The map relating to Newark Airport revealed that the nearest residential and congested area to Newark Airport lies three-quarters of a mile in a westerly direction from runway 10–10–28 and further reveals that the nearest residential and congested area in the city of Elizabeth lies 1¼ miles from the southwesterly end of runway 6–24.

Using these distances as a criteria, all of the remaining 99 airport maps were studied. Such revealed that 44 airports have residential areas closer to runways than is represented by the ¾-mile distance between runway 10–28 and the residential areas in the vicinity of Newark, and that 11 additional cities have residential areas approximately the same distance from the nearest runway. Such studies further revealed that 62 of these 100 airports have residential and congested areas closer to runways than is the nearest residential and congested area of Elizabeth to any of the existent runways on Newark Airport.

I mention this fact solely for the purpose of indicating that the proximity of congested residential areas to Newark Airport is typical of large metropolitan airports throughout this country.

The lack of or occurrence of accidents are not necessarily conclusive in all cases of the existence or nonexistence of proper safety criteria. It is, however, a proper element of consideration in the appraisal of a given facility. A review, therefore, was made of accidents on and in the vicinity of Newark Airport during the long period of its existence. Few, if any, major airports in the United States have a record of operational safety over the years that can equal the record of Newark. In fact, the record revealed that the last fatal accident at this airport, prior to the 6–24 accident on December 16, 1951, involving scheduled air transport aircraft, occurred over 22 years ago.

Inasmuch as previous testimony before this committee and state-

ments of individuals and reports in the press appear to reflect serious misunderstanding of the operational responsibilities of the port authority, the Civil Aeronautics Administration, the Civil Aeronautics Board, the airlines, and other aircraft operators in the day-to-day operation of this airport, I believe it important to clarify here, as a matter of record, the responsibilities of these various agencies.

You have previously received a copy of a lease agreement between the city of Newark and the port authority which outlines in considerable detail the responsibilities of the authority in connection with the financing and development of this field. In carrying out the terms of this contract, and in the performance of other responsibilities which normally fall on the operator of an airport, the authority is responsible for the financing, development, operation and day-to-day management of the physical plant of the airport itself. It has no authority whatsoever over the right of an airline or other aircraft operator to provide air service to the Newark-Elizabeth area, the mechanical condition of the aircraft, the weather minima which govern aircraft operations, the traffic control of aircraft during taxiing, landing, and take-off, the airworthiness of the craft, the qualifications of the pilot personnel, the instructions or authorizations given to pilots by the control tower, or the operation of landing-aid facilities other than the furnishing of electrical power.

As is well known by the members of this committee, the field of regulation of interstate commerce by air has been preempted by the Federal Government through the enactment of the Civil Aeronautics Act of 1938, as subsequently amended, and other pertinent legislation. The Civil Aeronautics Administration and the Civil Aeronautics Board are the designated agencies of the Congress of the United States for carrying out these Federal responsibilities, and it is through the workings of these two instrumentalities of government that the standards and criteria of aircraft operation at Newark Airport are established.

As a typical example of the foregoing division of responsibility, let us presume the operation of trip 22 of January 4, 1952, of Acme Airlines, a hypothetical certificated air carrier, with Convair aircraft, which is used purely for the sake of illustrating my mind, into Newark Airport under daylight instrument conditions after a scheduled trip carrying persons, property, and mail from Washington, D. C. The authority of Acme Airlines to carry persons, property, and mail into Newark Airport as a common carrier on this trip would reflect the decision of the Civil Aeronautics Board. The decision to purchase Convair-type aircraft would be the decision of Acme Airlines. The authorization for Acme to operate this particular type of aircraft carrying persons, property, and mail would require approval of the Administrator of Civil Aeronautics under airworthiness requirements established by the Civil Aeronautics Board. The competency of the captain and the first officer to operate Convair-type aircraft into Newark Airport under instrument conditions carrying persons, property, and mail would be the decision of Acme Airlines and the Administrator of Civil Aeronautics.

The decision to operate trip 22 on January 4, 1952, into Newark Airport would be the decision of Acme Airlines. The weather minima of visibility and ceiling for daylight instrument operations of

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Convair-type aircraft operated by Acme Airlines at Newark Airport would be established by the Administrator of Civil Aeronautics, and the decision to operate at such minima or at higher minima would be the decision of Acme Airlines.

Official weather readings on January 4 would be taken by personnel of the United States Weather Bureau. Clearance of Acme trip 22 on January 4 to the Newark Airport control tower would be the action of the Air Traffic Control Center of the Civil Aeronautics Administration. Communication between the control tower and the flight crew would be carried on by tower personnel of the CAA, utilizing radio equipment paid for, owned, and maintained by the Civil Aeronautics Administration. The ILS equipment located on Newark Airport for the purpose of actuating the ILS instruments in Acme trip 22 is owned, operated, and maintained by the Civil Aeronautics Administration and located on a plot of ground on the airport leased by the Civil Aeronautics Administration from the port authority for this purpose.

The GCA (ground control approach) available for monitoring trip 22 of Acme consisted of equipment owned and maintained by the Civil Aeronautics Administration and operated by personnel employed by the CAA.

I make the foregoing detailed analyses of responsibility with respect to this particular operation because it has been previously alluded to today by questions and because of the confusion in the public mind with respect to the various responsibilities for the technical and operational aspects of air transportation. I might say that the table I have outlined is in nowise peculiar to Newark Airport. You could shift it to LaGuardia or Washington and it would follow the same pattern.

As a matter of further reference in connection with the foregoing considerations, I have herewith and submit a copy of lease between the port authority and the United States of America, dated September 17, 1948, and relating to the operation by the Civil Aeronautics Administration of the control tower and so forth, at Newark Airport. In this connection I direct your attention specifically to the following provisions reflecting rights reserved by the Civil Aeronautics Administration at Newark Airport and I quote verbatim:

(A) 1. To operate an airport traffic control tower and to install and maintain therein all necessary radio and other equipment for such operation at the Newark Airport, Newark, New Jersey, situated in the County of Essex and State of New Jersey, for the guidance, information, and instruction of pilots in the landing and taking off or airplanes and moving the same to and from the runways and taxiways to administration building on such airport, or to such other places designated by the lessor on such airport for the landing and taking off of airplanes and for vehicles using the landing area on such airport.

(K) It is further understood and agreed that the Government will operate the control tower strictly as a federal traffic control facility and maintain all equipment and appurtenances installed by the Government in the premises described.

Mr. KLEIN. The lease between the port authority and the United States of America will be received in evidence and marked "Exhibit PA–28."

(The item referred to was marked "Exhibit PA–28" and made a part of the committee files.)

Mr. GLASS. Traffic patterns which have been the subject of much consideration, in the vicinity of Newark Airport, have historically been established by the Administrator of Civil Aeronautics acting under the authority granted him by the Congress.

On February 4, 1949, the Administrator of Civil Aeronautics published revised traffic patterns for this airport, to become effective at 0600 eastern standard time, March 1, 1949. The patterns publicly known as antinoise patterns are shown in the attached exhibit which I offer for the consideration of the committee.

Mr. KLEIN. The antinoise patterns will be received in evidence and marked "Exhibit PA–29."

(The item referred to was marked "Exhibit PA–29" and made a part of the committee files.)

Mr. GLASS. On August 4, 1950, the Acting Administrator of Civil Aeronautics published a revision to this air-traffic rules to be effective at 0001 eastern standard time, August 15, 1950. This revision rescinding the antinoise patterns read in part as follows:

> Operators of aircraft taking off from or landing at Newark, New Jersey, shall adhere to the following traffic patterns and altitudes made a part thereof, unless otherwise authorized or directed by Air Traffic Control:
>
> (*a*) All aircraft shall be operated to follow a standard left-hand rectangular traffic pattern which, for each runway, is contained within a five-mile radius of the center of the airport.
>
> (*b*) Landing aircraft shall be operated so as to join the traffic pattern at or above an altitude of 1,200 feet mean sea level, weather permitting.

This is the traffic pattern in effect at the Newark Airport today.

The question of aircraft noise has long been a matter of serious concern to commissioners and staff of the port authority. It represents, in our opinion, one of the broad social problems of transportation. In an effort to contribute the resources of the port authority to the maximum possible extent in coping with this problem, the authority particularly through the staff under my jurisdiction, has constantly and consistently worked with those concerned with the problem. I will not belabor you with the detailed narration of the numerous activities of many individuals. I would like, however, to call your attention to the fact that, to my knowledge, the authority has constantly taken the affirmative with respect to this subject with the airlines and with the CAA and has participated in every meeting, in every conference, and in every committee action throughout the port district which has concerned itself with the problem of aircraft noise. However, as you gentlemen well know, the power to minimize aircraft noise problems lies basically within the responsibility of the aircraft operators and the CAA. Inasmuch as the port authority has no control over the volume of air transportation, the specifications of the aircraft and their power plant used in providing such transportation, traffic patterns or traffic controls, there is little from a tangible standpoint that the authority can do in this regard.

I particularly call your attention to the committee on aircraft noise under the chairmanship of the president of the Borough of Queens, especially last summer in the Borough of Queens, which has been studying actively this subject as it particularly relates to LaGuardia and New York International for a period of many months, and to the recently organized committee concerned with the problem in the vicinity of Newark Airport, under the initial auspices of the CAA. In

addition to these very considerable activities, innumerable days have been expended in conference with officials of the Civil Aeronautics Administration, the Air Transport Association, the airlines, and the trade organizations of the aircraft manufacturing industry in an effort to push actively directed action toward the solution or minimizing of this problem as rapidly as possible.

Although, as I have previously stated, the control of air traffic both in the air and on the ground is placed by law in the Civil Aeronautics Board and in the Administrator of Civil Aeronautics, we proposed to the airlines, ATA, ALPA, and CAA that immediate consideration be given to the use of runways during take-offs on a preferential or preference basis.

Careful studies made by port authority staff personnel indicated that utilizing a crosswind factor of 15 miles per hour, take-offs could be made to the east over Newark on runway 10 approximately 38 percent of the time; that they could be made to the north over runway 6 (permitting flight over the Newark meadows and industrial area) 14 percent of the time; and when necessary, in a southerly direction on runway 24 (which, however, permitted a turn under almost all conditions prior to the time the aircraft approached the city of Elizabeth) 41 percent of the time, and when necessary, in a westerly direction on runway 28 toward Newark for approximately 7 percent of the time.

The following of the foregoing preference sequence in dispatching aircraft from Newark would obviously very substantially minimize the volume of operations that have historically been taking off over the residential area of Newark to the west of the airport and over the residential and business area of Elizabeth to the south, under weather conditions affording several choices of take-off direction to the control tower and the aircraft pilot.

Consideration of the problem with the Civil Aeronautics Administration, the airlines and the Airline Pilots Association elicited immediate response and offers of cooperation. It was pointed out, however, by the aircraft operators that the effective utilization of runway 10 for take-offs in an easterly direction made mandatory the construction of a taxiway to the westerly end of this runway so as to facilitate the movement of aircraft to take-off position.

The commissioners of the port authority promptly authorized on October 11, 1951, the construction of this taxiway at a cost of approximately $175,000. Such taxiway was placed in operation on February 2, 1952, and the CAA promptly instructed its control tower to observe the following order of priority for take-offs:

> Priority 1 would take off to the east on runway 10; priority 2 would take off to the north on runway 6; priority 3 would take off to the south on runway 24; priority 4 would take off to the west on runway 8.

The Air Transport Association, an organization composed of substantially all of the certificated air carriers of the United States, notified operating companies directing that such procedure be followed. The Airline Pilots Association expressed approval of the procedure and gave assurance of continued cooperation by their member pilots through its observance.

Subsequent to the tragic accident involving National Airlines trip 101 in the early morning hours of February 11, considerable discus-

sion has ensued as to whether or not the runway preference system was being followed; or whether the crosswind component utilized by the CAA tower was 5 or 15 miles per hour. There has been further loose comment with respect to the existence of certain ripples in the surface of the west end runway 10–28, which allegedly affected the utilization of this runway for take-off and landing. For these reasons I would like here to provide the committee with pertinent facts with respect to both of these subjects.

The procedures for the control of air traffic utilized by the CAA provide that when surface wind velocities are less than 6 miles per hour, aircraft shall be authorized to use the runway which has been designated as the "calm wind" runway and that when surface wind velocity is 6 miles per hour or more, aircraft shall ordinarily be authorized to use the runway most nearly alined into the wind.

It was affirmatively stated by representatives of the Air Transport Association during meetings in September and October 1950 with respect to Newark Airport and during subsequent meetings with respect to the adoption of preferential runways at La Guardia and New York International that efforts would be immediately made to obtain concurrence of the airlines ot utilize a crosswind component of 15 miles per hour in connection with take-offs under the runway preference system and in the event such occurrence was obtained, to request CAA approval.

The port authority was advised during late 1951 that such had been approved by the airlines and I was subsequently verbally advised that such had been approved by the CAA. Such advice was specifically confirmed by the memorandum of Mr. John Grove, manager, New York operating office, Air Transport Association, to the airline members of ATA dated February 1, 1952, advising the airlines that the above-described preferential runway use for take-offs would be placed in effect at Newark Airport on February 2, 1952, and that CAA's control tower would direct aircraft to utilize runways in accordance with the previously announced plan when the crosswind component does not exceed 15 miles per hour.

Because of the fact that the preferential runway use at Newark marked, to the best of my knowledge, the first time that the procedure had been followed in the long history of air transportation, we were particularly anxious to ascertain data with respect to its actual operation.

My office accordingly made arrangements with the Civil Aeronautics Administration to obtain the services of Civil Aeronautics Administration controllers on an off-duty basis for the purpose of observing and recording the runway utilization at Newark. These men were paid by the authority with the consent and knowledge of the Civil Aeronautics Administration for their services in the recording of this information at the rate of $2 per hour.

Inasmuch as the taxiway to runway 10–28 was scheduled for completion on February 5, arrangements with respect to these men had been made for this date. We are, therefore, in possession of detailed records in this regard since 1801, February 5.

Analysis had been made of the foregoing information from 1801, February 5, to 2400, February 10, utilizing the cross-wind component of 5 miles per hour, and similar analysis has been made utilizing a cross-wind component of 15 miles per hour.

I would like to submit, if I may, these detailed-analysis sheets, the first one being an analysis of the take-off on the 5-mile-an-hour cross wind, and the second on a 15-mile-an-hour cross wind.

Mr. KLEIN. The two analyses will be marked "Exhibits PA–30 and PA–31," respectively, and received in evidence.

(The items referred to were marked "Exhibits PA–30 and PA–31," respectively, and made a part of the committee files.)

Mr. GLASS. As you will thereon note, there were 820 take-offs from Newark Airport during the period stated. Using 5 miles per hour as the cross-wind criteria, runway priority 1 (runway 10 to the east) was usable 55 times and was used twice; runway priority 3 (runway 24 to the south) was the first choice 375 times and was utilized 388 times. The last priority (runway 28 to the west) was necessary 390 times and was used 430 times.

Analyses using a cross-wind component of 15 miles per hour or less reflected that during the period stated priority 1 (runway 10 to the east) was usable 123 times and was used twice; priority 2 (runway to the north) was first choice 453 times and was used 388 times; priority 4 (runway 28 to the west) was necessary 233 times and was used 430 times.

As you will note, and as I previously stated, this analysis was up to midnight, February 10; that is, 2400.

Information supplied to the authority with respect to take-off operations at Newark subsequent to 2400 of February 10 and 0300 February 11, when the airport was closed, reflects the following [reading]:

Time, 0011; plane, 04–V; type, Bonanza; take-off, with S–6 wind; runway used, 24.

Time, 0013, which was the aircraft involved in the accident; plane, NAL 101; type, DC–6; take-off, with south wind, 6 miles per hour; runway used, 24.

Time, 0028; plane, X–92856; type, C–46; take-off, with south 6-mile wind; runway used, 24.

Time, 0031; plane, EAL 631–WB; type, Constellation; take-off, with south 5-miles-an-hour wind; runway used, 24.

Time, 0042; plane, NAL 101–B; type, DC–6; take-off, with south 8-miles-an-hour wind; runway used, 24.

Time, 0144; plane, NAL 105; type, DC–4; take-off, with 5-miles-an-hour southeast wind; runway used, 10.

I further herewith submit the copy of the record of the airport with respect to take-offs of aircraft primarily for the purpose of ferrying to other fields subsequent to the time the runways were closed to operation at 0300 of February 11. As will be noted thereon, such take-offs total 47, and all were made on runway 10 to the east on cross winds from 3 to 15 miles per hour. As will be further noted, these aircraft included Beachcraft, DC–3, Convair, C–46, and Lockheed Constellation-type equipment.

I would like next to comment with respect to the so-called ripples on runway 10–28, inasmuch as comments from certain undisclosed parties with respect to this condition of the runway has been made to the press.

There exists near the west end of runway 10–28 two ripples in the asphalt coating, one having a maximum depth of 3½ inches and the other 3 inches. These ripples resulted from the uneven settlement

of the base of the runway, a condition common to runways having this type of coating. These ripples were in no way a factor in the use of runway 10–28 for take-off to the east or landing from the west. The fact that aircraft turning onto the runway from the taxiway to the west end for take-off to the east would be moving at this particular spot at very low rates of speed made the ripples particularly inapplicable to take-offs on runway 10. There exists a similar condition near the southwest end of runway 6–24, with the ripples at this point extending to a depth of approximately four inches. These ripples were scheduled for routine repair and were included in the contract which was let for the construction of the access taxiway to runway 10–28. A request was made to the chief engineer of the authority for an engineering description of these depressions on both runways. Such reply of the chief engineer is as follows [reading]:

Depressions of this nature are normal in flexible pavement of runways on soft subgrades and do not affect the operational use thereof. They result from the uneven settlement of the base of the runway.

Approximately 400 feet from the effective south end of the northeast-southwest runway (6–24), there is a depression, which has a maximum depth of 4½ inches at the center. The total length of this depression from grade point to grade point is about 75 feet. Seventy feet north of this there is another depression which has a maximum depth of approximately 3½ inches at the center. The total length of this depression from grade point to grade point is about 55 feet.

Similar depressions in the east-west runway at the westerly end are by comparison only 3 inches and 3½ inches in depth and are slightly longer from grade point to grade point.

Periodically, the port authority builds up these depressions with additional blacktop paving. Typically, this work was done at Newark Airport on at least two previous occasions since the port authority assumed jurisdiction.

These repairs at Newark were to be completed during the spring of 1952 in a routine manner.

Because of the fact that these ripples would have had greater effect upon aircraft landing from the west at high speed than it would have had on aircraft passing over the area at low speed in take-offs to the east, a review was made of aircraft movements during the period February 5 to February 10 above described, in order to ascertain the utilization made of runway 10–28 for landings from the west. Such records reflect that during this period the following aircraft landed from the west on runway 10 [reading]:

Date, February 8; time, 2045; plane X–1246N; type, C–46; wind, 15 miles an hour southeast.

Date, February 8; time, 2051; plane, EAL 626; type, Constellation; 15-mile-an-hour southeast wind.

Date, February 8; time, 2058; plane, SL 167938; type, C–46; 15-miles-an-hour southeast wind.

Date February 8; time, 2104; plane, TWA 420; type, DC–3; 15-miles-an-hour south-southeast wind.

Date, February 8; time, 2114; plane, UAL 122; type, DC–3; 15-miles-an-hour south-southeast wind.

Date, February 8; time, 2126; plane, EAL 516; type, Constellation; 12-miles-an-hour south-southeast wind.

Date, February 8; time, 2138; plane, SL 162030; type, C–46; 15-miles-an-hour southeast wind.

Date, February 8; time, 2144; plane, EAL 452; type, DC–3; 15-miles-an-hour southeast wind.

Date, February 8; time, 2145; plane, EAL 502; type, Constellation; 15-miles-an-hour southeast wind.

Date, February 8; time, 2155; plane, RAL 108; type, DC–3; 15-miles-an-hour southeast wind.
Date, February 8; time, 2156; plane, UAL 130; type, DC–3; 15-miles-an-hour southeast wind.
Date, February 8; time, 2204; plane, XO–4–Z; type, Bonanza; 15-miles-an-hour south-southeast wind.
Date, February 8; time, 2205; plane, AAA 706; type, DC–3; 15-miles-an-hour south-southeast wind.
Date, February 8; time, 2220; plane, AAL 742; type, Convair; 10-to-15-miles-an-hour south-southeast wind.
Date, February 8; time, 2221; plane NAL 60; type, DC–4; 15-miles-an-hour southeast wind.
Date, February 8; time, 2228; plane, EAL 504; type, Constellation; 15-miles-an-hour south-southeast wind.
Date, February 8; time, 2233; plane, AAA 534; type, DC–3; 15-miles-an-hour south-southeast wind.
Date, February 8; time, 2256; plane, UAL 612; type, DC–6; 12-miles-an-hour south-southeast wind.
Date, February 8; time, 2301; plane, NAL Fry. 92; type, DC–6; 15-miles-an-hour south-southeast wind.
Date, February 8; time, 2325; plane, NAL 86; type, DC–4; 10-miles-an-hour south-southeast wind.
Date February 10; time, 2013; plane RAL 8; type, DC–3; 4-miles-an-hour-south-wind.
Date, February 10; time, 2034; plane, AAL 742; type, Convair; 5-miles-an-hour south-southeast wind.
Date, February 10; time, 2052; plane AAL 748; type, Convair; 5-miles-an-hour south-southeast wind.
Date, February 10; time, 2129; plane, TWA Fry. 342; type, DC–3; 5-miles-an-hour south-southeast wind.
Date, February 10; time, 2145; plane, AAA 706; type, DC–3; 5-miles-an-hour south-southeast wind.
Date, February 10; time, 2235; plane, AAA 374; type DC–3; 10-miles-an-hour southeast wind.

At no time during the extended discussion between the CAA, the ATA, the ALPA, and the port authority with respect to the observance of runway preference at Newark was the condition of either runway 10–28 or 6–24 considered or even mentioned to my knowledge, by any party or agency concerned with the matter as a condition affecting the adoption of the previously described runway preference system.

Consideration was given to the flight testing of the system during one of the September 1951 meetings. This, however, was not given further consideration and, insofar as I know, was not even discussed following a letter from the manager of the New York operations office of the Air Transport Association to the Civil Aeronautics Administration under date of October 11, 1951, which contained the following statement [reading]:

> Concerning the flight tests that I have mentioned in my October 1st letter, I have discussed the feasibility of using runways 10 and 6 for DC–6 and Constellation take-offs, and have been informed by the airlines operating these types of aircraft that runways 10 and 6 are both satisfactory as take-off runways. In view of this fact, it would seem unnecessary to conduct any further flight tests to assess the adequacy of these runways for take-off purposes.

The question naturally arises to the nature of take-off operations at the airport after construction of runways A and D, if preferential use of runways is continued. A review of the wind conditions at Newark as related to the alinement of these runways indicates that if the above-enumerated take-off preferences are continued the percentage of operations in the available four directions of take-off (uti-

lizing a cross-wind component of 15 miles per hour) will be as follows [reading]:

Priority 1: Take-off from the west to the east on runway D (over Newark Bay), 38 percent of the time;

Priority 2: Take-off from the south in a northerly direction on runway A (over the Newark industrial area), 24 percent of the time;

Priority 3: Take-off from the north to the south on runway A (over the Arthur Kill), 31 percent of the time;

Priority 4: Take-off from the east to the west on runway D (toward Newark), 7 percent of the time.

As a matter of further interest, however, it is to be pointed out that, in the event priorities were changed so as to make take-offs to the north on runway A first priority and take-offs to the south on runway A second priority, northerly takeoffs could be made 47 percent of the time; southerly take-offs could be made 45 percent of the time; take-offs to the east on runway 10 would be necessary only 1 percent of the time, and take-offs to the west on runway 7 would be necessary only 7 percent of the time.

To date, consideration has not been given to the establishment of preference in the handling of aircraft landings. Studies of wind conditions at the airport indicate, however, that landings (based upon the above-stated factor of 15-miles-per-hour cross wind) are required from the west (over Newark) on runway 10 only 1 percent of the time; in a northerly direction (over Elizabeth), on runway 6, 18 percent of the time. Consequently, landings could be made from the north (over industrial areas), on runway 24, 31 percent of the time, and from the east (over Newark Bay), on runway 28, 50 percent of the time.

On completion of runway A, the landings made from a southern and a northerly direction would be, of course, approached over the Arthur Kill and would not require operation over the congested area of Elizabeth now required by runway 6–24.

I mentioned a little while back that I was submitting the records of the airport with respect to take-offs of aircraft primarily for the purpose of ferrying to other fields subsequent to the time the runways were closed to operation at 0300 February 11. That record follows. Under the title or heading "Record of aircraft taking off from Newark Airport between the hours of 0300 and 0930 of February 11, 1952" [reading]:

Time, 0418; aircraft, NAL 75; type, DC–4; wind, 12-miles-an-hour southeast; runway used, 10.

Time, 0446; aircraft, TWA 342; type, DC–3, 12-miles-an-hour southeast wind; runway used, 10.

Time, 0450; aircraft, AAL 219; type ,Convair; 10-miles-an-hour southeast wind; runway used 10.

Time, 0454; aircraft, AAL 274; type, Convair; 10-miles-an-hour southeast; wind; runway used, 10.

Time, 0456; aircraft, TWA 352; type, DC–3; 10-miles-an-hour southeast wind; runway used, 10.

Time, 0457; aircraft, TWA 326; type, DC–3; 15-miles-an-hour southeast wind; runway used, 10.

Time, 0501; aircraft, UAL 1944; type, DC–3; 10-miles-an-hour southeast wind; runway used, 10.

Time, 0504; aircraft, UAL 1946; type, DC–3; 10–miles-an-hour southeast wind; runway used, 10.

Time, 0506; aircraft, AAA 229; type, DC–3; 10-miles-an-hour southeast wind; runway used, 10.

Time, 0507; aircraft, AAL 261; type, Convair; 10-miles-an-hour southeast wind; runway used, 10.

Time, 0510; aircraft, UAL 115; type, Constellation; 10-miles-an-hour southeast wind; runway used 10.

Time, 0511; aircraft, X–62030; type, C–46; 10-miles-an-hour southeast wind; runway used, 10.

Time, 0512; aircraft, X–62029; type, C–46; 10-miles-an-hour southeast wind; runway used, 10.

Time, 0512; aircraft, AAA 751; type, DC–3; 10-miles-an-hour southeast wind; runway used, 10.

Time, 0515; aircraft, EAL 206; type Constellation; 10-miles-an-hour southeast wind; runway used, 10 .

Time, 0519; aircraft, X–67941; type, C–46; 10-miles-an-hour southeast wind; runway used, 10.

Time, 0520; aircraft, AAA 227; type, DC–3; 12-miles-an-hour southeast wind; runway used, 10.

Time, 0526; aircraft, EAL 376; type, DC–3; 8-miles-an-hour southeast wind; runway used, 10.

Time, 0527; aircraft, UAL 4561; type, DC–3; 7-miles-an-hour southeast wind; runway used, 10.

Time, 0528; aircraft, UAL 1942; type, DC–3; 10-miles-an-hour southeast wind; runway used, 10.

Time, 0529; aircraft, AAL 270; type, Convair; 12-miles-an-hour southeast wind; runway used, 10.

Time 0529, aircraft X1668M, type C–84, 10-mile-an-hour southeast wind, runway used 10; time 0530, aircraft SL167942, type C–46, 8-mile-an-hour southeast wind, runway used 10; time 0542, aircraft UAL1068, type DC–3, 10-mile-an-hour southeast wind, runway used 10; time 0546, aircraft AAL44Z, type Convair, 10-mile-an-hour southeast wind, runway used 10; time 0540, aircraft X1312V, type C–46, 10-mile-an-hour southeast wind, runway used 10; time 0558, aircraft X67980, type C–46, 10-mile-an-hour southeast wind; runway used 10; time 0558, aircraft RAL117, type DC–3, 10-mile-an-hour southeast wind, runway used 10; time 0559, aircraft X1913M, type C–46, 10-mile-an-hour southeast wind, runway used 10; time 0838, aircraft X200A, Lockheed type, 4-mile-an-hour southwest wind, runway used 10; time 0838, aircraft X8613A, type Beechcraft, 4-mile-an-hour southwest wind, runway used 10; time 0840, aircraft AAL420, type DC–4, 4-mile-an-hour southwest wind, runway used 10; 0846, aircraft X300A, type DC–3, 4-mile-an-hour southwest wind, runway used 10; time 0846, aircraft X700E, type Beechcraft, 4-mile-an-hour southwest wind, runway used 10; time 0847, aircraft EAL103, type Constellation, 4-mile-an-hour southwest wind, runway used 10; time 0851, aircraft UAL1453, type DC–3, 4-mile-an-hour southwest wind, runway used 10; time 0851, aircraft RAL370, type DC-3, 4-mile-an-hour southwest wind, runway used 10; time 0903, aircraft EAL346, type DC–3, 3-mile-an-hour southwest wind, runway used 10; time 0904, aircraft XIC, type DC–3, 3-mile-an-hour southwest wind, runway used 10; time 0905, aircraft X44981, type Lockheed, 3-mile-an-hour southwest wind, runway used 10; time 0905, aircraft X67981, type C–46, 3-mile-an-hour southwest wind, runway used 10; time 0936, aircraft X92V, type Beaver, 4-mile-an-hour southwest wind, runway used 10; time 0937, aircraft SAM9934, type C–47, 5-mile-an-hour southwest wind, runway used 10; time 0938, aircraft UAL6548, type DC–6, 4-mile-an-hour southwest wind, runway used 10; time 0941, aircraft X35M, type C–46, 4-mile-an-hour southwest wind, runway used 10; time 0943, aircraft X69343, type C–46, 3-mile-an-hour southwest wind, runway used 10; and time 0944, aircraft X14M, type C–46, 4-mile-an-hour southwest wind, runway used 10.

That covers my report, gentlemen, and my direct statement.

Mr. KLEIN. Did I understand you to say, in your statement, Mr. Glass, that the ILS equipment is owned by the Civil Aeronautics Administration?

Mr. GLASS. The ILS system requires two pieces of mechanism. The actuating mechanism is on the ground and there is one in the air itself. The ILS equipment at the airport, which actuates the ILS equipment in the plane itself, is owned by the CAA and installed by the CAA, whereas the equipment in the airplane is owned by the owner of the airplane.

Mr. KLEIN. The port authority has nothing to do with it?

Mr. GLASS. No, except that the Civil Aeronautics Administration advises us that they desire to install ILS equipment and we lease them to the—we lease them the ground necessary for that installation, for which they pay us. Our relation is that of landlord and tenant.

Mr. KLEIN. So that wherever you have instruments for landing and aids for taking off, the port authority has nothing to do with it except for its arrangement with the CAA?

Mr. GLASS. Our only activity in connection with that is that we lease the land to the CAA and we furnish the electricity. The installation, maintenance, and operation of the facilities themselves are the function of the CAA.

Mr. KLEIN. Mr. Cohn, the prosecutor of Union County, has asked me to submit this question to you:

Under this new proposed runway, wouldn't that be right in line with and expose the following plants and industrial establishments to the hazard of plane crashes on take-offs: the Standard Oil Co., full of tanks, Phelps-Dodge Corp., Grasselli Chemical Co., Singer Manufacturing Co., Bayway Terminal, Bethlehem Steel Corp., Staten Island Ferry, and other oil and chemical companies in Linden?

Mr. GLASS. I am not thoroughly familiar with those details, and of course it doesn't follow that an airplane on take-off will follow a straight line all the way through. Offhand, I can't say how all of these plants that you have mentioned are located.

Mr. KLEIN. Does that answer your question, Mr. Cohn?

Mr. COHN. No, sir, it only follows the same difficulty we had in the three other crashes. We had the first one over Elizabeth River that just missed the Alexander Hamilton High School; the second one just missed St. Elizabeths Hospital, St. Mary's Parochial School, and the third one missed the Janet Memorial by a matter of 2 seconds.

Under this proposed new plan, I am fearful planes will strike some of the places I have just told you about, and if a plane hits the Standard Oil tanks, Elizabeth will be Elizabeth no more.

Mr. KLEIN. I think this witness cannot answer your question categorically, Mr. Cohn. If you will submit any statement you or the city of Elizabeth may wish to present as rebuttal against what has been presented here so far, the committee will be very glad to consider it, provided of course that such statements are under oath, the same as the statements of any other witnesses so far.

Mr. GLASS. The prosecutor is referring to a certain or particular runway and that has the 50-to-1 criteria established by the CAA, which means in effect that for every 50 feet you go out, you have that clearance. It is a standard criteria all over the world. This runway will comply with that highest qualification.

Mr. WOLVERTON. Mr. Glass, you have given us detailed descriptions of the controls that are centered in the Federal agencies to indicate that in these matters the port authority does not have jurisdiction. You summarize your description of a quite mythical flight No. 22 by saying in your statement:

As is well known by the members of this committee, the field of regulation of interstate commerce by air has been preempted by the Federal Government through the enactment of the Civil Aeronautics Act of 1938, as subsequently amended, and other pertinent legislation. The Civil Aeronautics Administration and the Civil Aeronautics Board are the designated agencies of the Con-

gress for carrying out these Federal responsibilities, and it is through the workings of these two instrumentalities of Government that the standards and criteria of aircraft operation at Newark Airport are established.

Now, at no time during your discussion of the subject, was there any mention made of the control by the CAA or any other agency over the kind or type of gasoline that is to be utilized by aircraft. Was your failure to mention that intentional, in that you do not have any jurisdiction over that subject?

Mr. GLASS. It was in nowise intentional. I simply tried to allude to the matters in which you are most interested. I did not know this morning that the matter of gasoline was of interest. However, I will try to answer the question that you propounded this morning.

Mr. WOLVERTON. The basic reason for the question being propounded this morning, and which has gathered momentum in my own thoughts since then, is because we are all aware of the fact that the type of gasoline has a great effect in attempting to gain altitude on take-off at an airport, so that regardless of how long a runway you may have contemplated, if the gasoline in the engine is not of sufficient quality to permit that engine to gain the proper altitude, all that you have referred to will go for naught, and it is for that reason that I wish to go into this question of gasoline.

Is there any test made by the New York Port Authority or by any other agency with respect to the type of gasoline that is used in an airplane before it takes off at your airfield?

Mr. GLASS. There are no tests made by the port authority for several reasons, and if you would like, I will be glad to elaborate.

The port authority, like every other operator of the major airports in the United States, is not in the gasoline business. We do not sell gasoline. One of the principles of operation which has been preserved with a zeal, I can assure you, is the right of the aircraft operator to secure his own supplies, particularly gasoline, from his own sources of supply. The leases which are in existence at LaGuardia and the lease that we inherited at Teterboro, and the settlement agreement covering the relations between the port authority and the airlines provide that the airlines purchase gasoline from their own selected source of supply, and the only exception to that is at Teterboro, where there is only one gasoline company that has the right, under a contract of 1946 and which runs to 1961, to sell gasoline to the airlines there. That situation we inherited at the time we took over the field.

At Newark or LaGuardia, as the case may be, the situation is different. Let's take the American Airlines at LaGuardia Field. The American Airlines are at perfect liberty to buy from any gasoline company that they desire, from the Esso, the Texaco, any of the companies that furnish gasoline, and these oil companies lease from us the ground and have the right to install their gasoline tanks and the gasoline is purchased by the purchasing department of the airline and delivered by the oil company and placed in the tanks of the airline.

The testing of that gasoline is a matter of a business relationship between the parties buying and selling the gasoline. If we made any suggestion to the airline, telling them to test their gasoline, we would be told to mind our own business and that it was no concern of ours, and rightly so. We would be told that our interference was unwar-

ranted and presumptuous and the airline would tell us that they have the right to purchase from whom they please, and so I say, if there is any information that you require in that connection, you would have to obtain that information from the suppliers and users of the gasoline. In other words, we have nothing to do with that and I can't tell you whether the gas used by American Airlines or any other of the airlines that purchase gasoline for use in their planes measures up to or below the standards that you have mentioned.

Mr. WOLVERTON. Do you have any supervision of the gasoline at Teterboro, where you operate that Esso concession?

Mr. GLASS. At Teterboro the Standard Oil Co. has the exclusive right to sell the gasoline on that field, and that exclusive right expires in 1959 with an option to renew for 2 years to 1961. Under that, the Esso sells direct to the buyers at their own prices or what they determine their price to be with their contract users. Under that arrangement, their trucks distribute gasoline to the field and put the gasoline in the tanks, using their own Esso gasoline trucks in bringing in the gasoline and their contract relationship is between the seller and the buyer.

As to other than the contract users on the field, we have a right to purchase whatever gasoline we may wish to use ourselves.

As to the matter of safety, we have a right to see that fire hazards are controlled with respect to storage and safety in handling the gasoline, and that is a matter that our personal inspector takes care of as a matter of routine, but as far as the gasoline itself is concerned, that is a matter of relationship between the buyer and the seller, we merely renting the ground to the seller. In some cases we install the tank for them but we do not control the product itself.

At New York International Airport there is a slightly different situation—there is a slight deviation. There we have a building—a very elaborate structure which is the largest gasoline storage system in the United States. In that, the airlines have a right to secure gasoline from any supplier. These suppliers bring the gasoline into the storage place in tanks and they pay us a storage fee, but testing of the gasoline, delivery schedules, and matters of that kind are strictly matters between the buyer and the seller and we do not have anything to do with the sale or control of the gasoline sales.

Mr. WOLVERTON. Do you have any responsibility with respect to knowing whether the gasoline you purchase under your agreement with the Esso company at Teterboro, measures up to the qualifications fixed by the CAA, the CAB, or the PAD?

Mr. GLASS. No.

Mr. WOLVERTON. Who does have that responsibility?

Mr. GLASS. Esso.

Mr. WOLVERTON. And there is no responsibility on the part of anyone else to ascertain whether the fixed formula is being placed into the tanks for use in the planes?

Mr. GLASS. Our responsibility is only as to providing a place for the contents and it is not a concern of ours as to whether or not the airlines do or do not specify certain qualifications for the gasoline they purchase. That is a matter beyond our scope and beyond our sphere.

Mr. WOLVERTON. Are you familiar with the result of the operation at the three fields that come within the jurisdiction of the Port of

New York Authority, to be able to say whether there has been any noticeable change with respect to the effect of the new formula that is used as a result of order No. 4, fixed by the PAD in their order of October 19 last, whereby they increased the amount of tetraethyl lead and decreased the amount of alkylate in the formula?

Mr. GLASS. For the reasons that I have already stated, not having any direct responsibility as to any of the formulae used in the gasoline, I would have no personal knowledge of that.

Mr. WOLVERTON. Are you aware that in some instances planes have taken off at any one of these three fields and found it necessary to return because of engine failure in recent months?

Mr. GLASS. We have records of aircraft that have returned at take-off. To my personal knowledge, several such instances may have occurred, but beyond that I cannot tell you.

Mr. WOLVERTON. Do you know whether the engine failures in those cases where it was necessary for them to return to the field was the result of engine trouble arising from corrosion as a result of an increased use of lead in the gasoline that was used?

Mr. GLASS. I have no knowledge of that. I dare say that the only place that could be obtained would be from the operator of the aircraft itself.

Mr. WOLVERTON. Well, Mr. Glass, do you know whether or not increased lead content, tetraethyl lead content, has a tendency to create corrosion in the engines, valves, governors, spark plugs, and so forth, as distinct from the use of gasoline having a higher content of alkylate instead of a larger quantity of tetraethyl lead?

Mr. GLASS. I am afraid I can't answer that, Congressman.

Mr. WOLVERTON. You have no knowledge, then, as to the effect of the increased use of tetraethyl lead on an engine?

Mr. GLASS. No.

Mr. WOLVERTON. Does anyone in your outfit have that information?

Mr. GLASS. I doubt it. You see, we are not concerned with that phase of it. At the best, it would be second-hand information.

Mr. WOLVERTON. I am very much interested in the subject and I am, therefore, seeking information from whatever source I can get, because it would seem to me that it is apparent that the use of tetraethyl lead in quantities that are now a component part of the formula can have a tendency to affect the proper power-producing possibilities of an engine and other parts of the engine, having in mind these accidents in Elizabeth following a period of 20 to 22 or 23 years of freedom from such incidents. Consequently, I am seeking to find out what could be the cause. In other words, if it is engine failure, was it due to the type of gasoline that is now used under the order of the PAD dated October 19, wherein the tetraethyl content was increased and the alkylate content decreased? That is why I have been asking you these questions, Mr. Glass.

Mr. GLASS. Sorry, sir; I have stated that I have no personal knowledge of the subject. If you would like me to get in touch with the technical members of our staff, I will be glad to have them down and give you whatever information they may be able to obtain for you on the subject.

Mr. WOLVERTON. I would appreciate that very much because in this last accident, as the plane was taking off, the control tower noticed that

the plane was not gaining altitude and called to the pilot and asked if he was in trouble. Now, I know that failure to gain altitude can be the result of insufficient octane because of corrosion due to the use of gasoline with a high content of tetraethyl lead.

Mr. GLASS. There is nothing more I can tell you along that line.

Mr. WOLVERTON. Well there is another question that I want to ask. Are you aware of the content of order No. 9 with respect to the question of damages?

Mr. GLASS. I have not paid any particular attention to that particular clause.

Mr. WOLVERTON. I am seeking to find out all I can about the purpose of that clause and the reason it was made a part of that order No. 4. The clause I refer to states—I said "order No. 9" but I meant section 7.

SEC. 7. Defense against claims for damages. No person shall be held liable for damages or penalties for any act or failure to act resulting directly or indirectly from his compliance with this order, or amendments thereto, so long as this order and its amendments shall remain in force, notwithstanding that this order, or any amendment thereto, or any part thereof, shall hereinafter be declared invalid by judicial or other competent authority.

I think you will agree, Mr. Glass, that is a pretty broad ruling and I am trying to find out what effect it has or will have in the accidents that have occurred in Elizabeth, where there would be death claims and property loss. I am trying to find out the reason or purpose for such a defense against claims for damages. It seems difficult for me to believe that its effect, if not its purpose, is to eliminate all right to damages suffered as a result of such accidents as we have had in Elizabeth.

Would you be able to tell me at any time whether it has been brought to the attention of the port authority and by whom and the reason?

Mr. GLASS. I am not aware that it existed.

Mr. WOLVERTON. Well, I have communicated with Secretary of the Interior Chapman and the Administrator for the Petroleum Administration for Defense, to give me an interpretation of that clause and the purpose that was expected to be served.

I have no further questions.

Mr. CARLYLE. Mr. Glass, I listened with considerable interest to the explanation of the authority vested in the different agencies. I understood you to relate the duties that were invested in the Civil Aeronautics Administration and certain duties that the Civil Aeronautics Board has to perform and the responsibility of the companies or the different airlines. Now, sir, are there any duties or responsibilities vested in the port authority that operates these airports?

Mr. GLASS. Yes; we have certain duties which I did not detail, but they relate to the financial development and operation of the physical plant itself. This, I assure you, in a large metropolitan area such as we have embraced in the surrounding territory of the airport under the control of the port authority, is quite extensive.

Mr. CARLYLE. If the New York Port Authority absolutely knew that a plane that had paid the Newark Airport for the privilege of using it—if the port authority absolutely knew that one of the airplanes had two or three defective engines, and that plane was scheduled to leave the airport say at 3 o'clock in the afternoon, would the

airport officials see to it, and would it not be the duty of the port authority officials to see to it that the engines received proper attention before the plane undertook to leave the airport?

Mr. GLASS. Let me answer it this way. If that came to the attention of the port authority officials at the airport, that should be promptly indicated to the officials of the Civil Aeronautics Administration who are normally stationed at these plants, and the decision would be up to the CAA but it would not be incumbent on the port authority to take any other action.

Mr. CARLYLE. Let's see. Three wrecks have taken place with unprecedented loss of life recently, a short distance from your airport, that is, the Newark Airport. Is it correct that those planes—two of those planes—had just left the airport and were trying to get back to the airport?

Mr. GLASS. Yes, the C–46 and the other on the morning of February 11 had both taken off from Newark Airport and the second one was apparently attempting to make an instrument landing.

Mr. CARLYLE. And they had not gone out of sight of the airport before this trouble developed?

Mr. GLASS. That's right.

Mr. O'HARA. Will the gentleman from North Carolina yield at this point?

Mr. CARLYLE. Certainly.

Mr. O'HARA. Was that C–46 gassed here at Newark?

Mr. GLASS. Our information was that the plane was supplied with 767 gallons of 100-octane gasoline supplied by the Shell Oil Co., the authorized supplier for that company in Newark. Also, that the plane already had a considerable amount of gasoline aboard prior to that time. All this information is second-hand, I might say, and the gasoline that was already on there was placed on the airplane at Fort Smith, Ark.

Mr. O'HARA. Let me ask about the second plane. That was not gassed here?

Mr. GLASS. No, that would have to be obtained from American Airlines.

Mr. O'HARA. What about the third plane that took off, the National Airlines' DC–6?

Mr. GLASS. My information is that airplane took on 1,991 gallons of 100-octane gas, Standard Oil gasoline, at New York International Airport. This plane took on passengers at Newark but did not take on gasoline at Newark.

Mr. O'HARA. Thank you.

Mr. CARLYLE. Now, Mr. Glass, how long after this plane left the airport—how long was it before the next plane took off?

Mr. GLASS. Your question is how long a period of time intervened between the departure of the C–46 on December 16 and the next plane that had trouble? That would take a considerable amount of checking. I don't have that information here.

Mr. CARLYLE. That is just a period of 3 or 4 weeks.

Mr. GLASS. As I understand your question—

Mr. CARLYLE. I am asking you this: How long was it from the time the first plane left this airport and developed serious trouble and difficulty in pulling out was it until another plane left the airport and had the same experience?

Mr. GLASS. I recall the dates were December 16, 1951, and the next one was February 11.

Mr. CARLYLE. Just a few weeks intervening?

Mr. GLASS. Just a little less than 2 months, sir.

Mr. CARLYLE. After the first airplane left Newark Airport and developed this serious trouble which resulted in the loss of life—the terrible loss of life—was any effort made by the port authority to see that careful inspection be made of planes before leaving the airport?

Mr. GLASS. No, sir, that has not been done, and it is not done in any airport in the country and if it were brought to my attention that it was being done here, I would vigorously oppose it.

Mr. CARLYLE. After the second plane accident which caused the great loss of life in trying to get back to the field, was there any effort made by the port authority to see that no airplane left without careful inspection?

Mr. GLASS. Again I must say that the responsibility for the observance of the proper safety standards and mechanical standards is on the operator of the airplane. Those standards are set by CAA, which is a Federal agency established and set up by Congress, and it is enforced by the CAA. It would be presumptuous and an unwarranted trespass on our part to attempt to do that. We have no business—no more business telling the CAA that they are doing a good job or a bad job than we have to tell you how to run this hearing. It may be that I do not think the motor-vehicle inspections in Elizabeth are not being done properly, but I have no right to tell them how to make those inspections. It is not our prerogative but the prerogative of the agency established by the Congress of the United States, the CAA.

Mr. CARLYLE. You are a high official of the port authority?

Mr. GLASS. Yes.

Mr. CARLYLE. Now, it has been definitely called to your attention that two airplanes using the airport you are connected with and the companies operating those planes have paid you to use this airport—that those two planes full of passengers left the Newark Airport without any steps having been taken to inspect them. In view of this fact, has the port authority taken any steps to see that no more airplanes leave the airport without being inspected to see that they are in proper operating condition?

Mr. GLASS. No, sir.

Mr. CARLYLE. So you are just leaving it to the company to see that the engines are in good condition?

Mr. GLASS. You either take 100 percent responsibility or none. There are airplanes taking off from LaGuardia Field—some 500 of them—and not a single person has looked at one of those planes—that is, not a single person connected with the port authority, and if anyone asked to do so, they would be told off in no uncertain terms.

Mr. CARLYLE. You take the responsibility—you take the position that there is no responsibility resting on the Port Authority of New York to make some investigation to determine whether or not the plane is in good condition?

Mr. GLASS. Definitely.

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Mr. CARLYLE. And you take that position after the experience that you have had in the past few weeks?

Mr. GLASS. I take the position that the Congress has put that responsibility on the Civil Aeronautics Administration. It would be presumptuous, ill-founded, injudicious, and an unwarranted trespass on our part to attempt to pass on the safety requirements set up by the CAA, the authorized Federal agency for that purpose, and I would be unalterably opposed to it.

Mr. CARLYLE. I am not speaking of safety requirements but of the safety of the ship.

Mr. GLASS. I am also speaking of that, and that is particularly a responsibility of the CAA.

Mr. CARLYLE. I know you would not be in favor of the port authority doing this from the legal point of view, but what about the moral standpoint?

Mr. GLASS. We are bound by the legal and statutory point of view.

Mr. CARLYLE. Do you think that the port authority can continue to operate an airport such as the Newark Airport and allow a ship to go into the air on the occasions that we have seen recently, and the authorities take no action at all to see that the ships are in good condition before leaving the ground?

Mr. GLASS. I think that is the authority of your committee. I know it is not our authority or the authority of the operators of the airport at Washington, Cleveland, or any other city. Our responsibility is the maintenance of the facilities and runways and to see that they are in good and in safe condition. It is the duty of your committee, as I see it, if you find that safety regulations are not being followed, to take that matter up with the agency you created, that is, the CAA.

Mr. KLEIN. In other words, the position of the port authority's real relationship with the airport is no different than that of any other landlord renting a piece of property to somebody?

Mr. GLASS. That is true. You can't tell a storekeeper how to run his business.

Mr. KLEIN. All you do is supply the buildings or the property that you are leasing, and whatever upkeep and maintenance the lease calls for?

Mr. GLASS. To a limited degree, that is true.

Mr. CARLYLE. Of course I agree with the legal position on that point, but I take the position that the operation of the airport involves a duty to do something after several occurrences of this kind.

Mr. HINSHAW. I would like to call the attention of Mr. Glass to page 25 of his statement—next to the last paragraph—which reads as follows:

> Analyses using a crosswind component of 15 miles per hour or less reflected that during the period stated, priority 1 (runway 10 to the east) was usable 123 times and was used twice; priority 2 (6 to the north) was the first choice 11 times and was not used; priority 3 (24 to the south) was the first choice 453 times and was used 388 times; priority 4 (runway 28 to the west) was necessary 233 times and was used 430 times.

Now, Mr. Glass, you have been in the airplane business for a long time, have you not?

Mr. GLASS. Yes, sir.

Mr. HINSHAW. I knew you before you were connected with the New York Port Authority and at that time you were one of the real responsible men in American aeronautics.

Mr. GLASS. I had responsibilities; yes.

Mr. HINSHAW. You recognize, of course, that if runway 6 is used for take-offs, it is likewise used for landings—in other words, if you can take off in one direction, you can't land, then, in the other direction without causing terrific traffic confusion at the same time.

Mr. GLASS. That is true.

Mr. HINSHAW. Would you recommend that runway 24 be used for landings at the same time that runway 6 was used for goings?

Mr. GLASS. Under normal conditions; no.

Mr. HINSHAW. So if runway 24 is used for take-offs, runway 6 is liable to be a landing runway?

Mr. GLASS. Yes.

Mr. HINSHAW. Therefore, the use of that for take-off purposes more or less means that the aircraft is going over the city of Elizabeth for landings?

Mr. GLASS. No, not necessarily. One of the prime considerations in a second runway is a much-debated subject, as where you go on a 15-mile-an-hour wind at landings, in one direction under calm conditions, or where the winds do not exceed the component, which go up as high as 25 miles an hour, you can take an airplane off of runway 10, and where the airplane takes off on runway 24, it does not mean you can do that under common wind conditions. Your statement may be true, but it doesn't follow that it is true. Quite the contrary.

Mr. HINSHAW. Don't you think it would be a good idea, in your analysis of cross-wind components, that consideration be given to the direction in which landings would be made?

Mr. GLASS. I cannot agree with you more heartily. In New York International, there has been established a preferential system of take-offs and landings. It took 25 years to put that into effect.

Mr. HINSHAW. In the operation of Newark Airport, do you have access to all four ends of these four runways by taxi strips?

Mr. GLASS. Yes.

Mr. HINSHAW. You also have access to the ends of the runways with the exception of the west end of runway 28?

Mr. GLASS. Yes.

Mr. HINSHAW. So that you now have taxiways on all four ends of both runways?

Mr. GLASS. Yes.

Mr. HINSHAW. In that case you certainly ought to be able to use cross-wind patterns in lands or take-offs?

Mr. GLASS. Yes.

Mr. HINSHAW. Where does the authority lie with respect to designation of runways?

Mr. GLASS. It is my understanding there is a degree of pilot choice in the consideration of the safety of the passengers. Any instructions or suggestions with respect to runway take-off is certainly within the choice of the pilot to refuse to go on a certain runway and he has that right for safety purposes.

Mr. HINSHAW. What about landing; is that true also?

Mr. GLASS. The same is true as to landing.

Mr. HINSHAW. That was my understanding.

Mr. GLASS. That is correct.

Mr. HINSHAW. Mr. Chairman, I know it is quite a chore, in view of the fact that the port authority has made an analysis of cross-

wind components from February 5—from 1801 February 5 to 2400 February 10. I think it would be very useful to examine that same period in respect to landings and the possibility of landings under cross-wind conditions, if they can furnish that to us.

Mr. GLASS. I have been advised that we have the basic information from which that can be made.

Mr. HINSHAW. And also to the next morning.

Mr. GLASS. The field was closed at 3 o'clock in the morning. However, if there were any landings, that would be included.

Mr. HINSHAW. Do I gather from your statement that you feel the DC–6 aircraft, as operated by National Airlines, violated the preparations or take-off arrangements made?

Mr. GLASS. I have made no accusations whatsoever What I attempted to do is to explain that enforcement of preferential runway systems or the enforcement of a preferential runway system is the responsibility of CAA and not a prerogative of the company. We have attempted to present the facts only. I have not and am not making any accusations.

Mr. HINSHAW. On a take-off at runway 10 the wind has to be 6 miles an hour?

Mr. GLASS. Correct.

Mr. HINSHAW. That is all.

Mr. MACK. When you were testifying you gave figures that indicated about half the airports in the country are as close to congested areas and cities as is the Newark Airport to the congested district of Elizabeth. Is that correct?

Mr. GLASS. A little better than half; around 62 percent I think it was, as I remember.

Mr. MACK. Another thing I noticed is that the State legislature has given you certain authority to remove certain or potential hazards to air navigation within 3 miles of the runways at Newark Airport that might now or hereafter exist. From that I presume you have contingent power to condemn.

Mr. GLASS. Yes, we have the power.

Mr. MACK. Just a few more questions. That also includes removing certain buildings or plants if you feel they would create a hazard?

Mr. GLASS. We wouldn't but the CAA would. We might make certain recommendations and they would consider it, if they thought it necessary they might establish an alternative proposal. In other words, if there was a ceiling authorized of a maximum of 250 feet to a half mile, and there was an obstruction or some buildings, shall we say, and the CAA advises that constitutes a hazard, and this was made known to us and given due consideration, if the decision was to take no action, then it would be the responsibility of the CAA to take alternative action and that would probably be to raise the ceiling from a half-mile to 3 miles.

Mr. MACK. At the present time you have no regulation that states it might be a certain area from the industries as long as you clear your 50 to 1 clearance?

Mr. GLASS. Yes; about 40 to 1 is normal.

Mr. MACK. You do not feel it will be necessary to eliminate or condemn any property that might cause a hazard in the flight path after take-off?

Mr. GLASS. You might carry that to an extreme. On most take-offs at LaGuardia Field, they might go right across Manhattan, which you will agree is hazardous.

Mr. MACK. I think that is all.

Mr. O'HARA. Just a few brief questions. I would like to ask you whether or not it is a fact that the runways and the facilities at Newark Airport had to conform to the CAA and CAB requirements, as well as the fact that in the operation of the airport, you would be operating on the basis of approval from the CAA or the CAB as to whether it was a safe or unsafe airport and all the other things that go into the operation of a modern airport?

Mr. GLASS. Yes, we would have to have the approval of the CAA.

Mr. O'HARA. And before you were able to get Federal funds, you had to clear with the CAA and the plans had to be approved as being a normal construction program which eliminated any unusual hazards that might exist with the new runways?

Mr. GLASS. That is true; not only from the viewpoint of being required, but as being good common sense. Furthermore, in constructing facilities in these heavily congested industrial areas, it makes it necessary to consider all the legal as well as the relationship to the surrounding areas. We have to get authorization and approval from the CAA before going ahead with any plans of that sort.

Mr. O'HARA. As a matter of fact, you cannot construct one little airport out in the cow country without getting Federal aid and without getting approval of the plans specifically?

Mr. GLASS. That is true.

Mr. O'HARA. And it takes several years sometimes before they are approved by the CAA? I have had to live through some of that, so I know something about it.

Mr. GLASS. Yes; but the CAA has been most efficient with us and most cooperative.

Mr. O'HARA. Without going back into the question of the difference between the moral and legal responsibility, as a matter of fact you have no legal responsibility as to the condition of planes that come in and out of that field?

Mr. GLASS. That is true; not only as to responsibility, but also as to authority.

Mr. O'HARA. In other words, an airport operator, whether it is the Port Authority of New York or any other operator of an airfield, is very similar to the operator of a garage. He does not control the situation to the point where he can say whether a man shall drive in with a Cadillac or an old model T Ford?

Mr. GLASS. That's right.

Mr. O'HARA. And he has nothing to do with whether the man driving the car has a car in good repair or bad repair?

Mr. GLASS. That's true.

Mr. O'HARA. It is a public operation?

Mr. GLASS. Yes.

Mr. O'HARA. And if the operator of a plane is about to take off with a bad ship, you have no authority to tell him to fix that plane?

Mr. GLASS. No authority whatsoever.

Mr. O'HARA. Any more than the operator of a garage has the right to tell you to fix up your car?

Mr. GLASS. Correct.

Mr. O'HARA. That is all.

Mr. KLEIN. Mr. Case has just asked to address a few more questions to the witness. Mr. Case has been very kind and cooperative with the committee and we will give him 5 minutes.

Mr. CASE. Mr. Glass, just one preliminary question. Secretary of Commerce Charles Sawyer is reported this afternoon to have said at the Florida convocation that the Newark Airport is to be reopened. Did or did not anyone in authority at the port authority have any previous knowledge of such statement?

Mr. GLASS. A piece of paper with that information on it was shown to me 5 minutes ago and that's all the knowledge I have of that.

Mr. CASE. It is not something that you have talked about with the Department of Commerce?

Mr. GLASS. This is the first I knew of it—this moment.

Mr. CASE. This other question: Do you regard yourself—that is, the Port Authority of New York—in the operation, expansion, and ownership and running of the airport, as a private agency or as a public agency?

Mr. GLASS. The authority is a public agency established by the States of New Jersey and New York.

Mr. CASE. This next question will probably come more within the legislative inquiry in the State. Does your public status, in your mind, give you any greater responsibility than would be the case of a private operation with respect to location, expansion, and operation?

Mr. GLASS. The port authority is strictly public and not a private agency in any sense of the word. The responsibility of operating the airport by the port authority is similar in status to the operation of a municipal airport. We are speaking strictly of the responsibility that we have—that being the same type of responsibility as cities have.

Mr. CASE. I appreciate your answer and it is a little bit hard for me to jibe that with the suggestion that Mr. Tobin made this morning that the port authority had no authority with regard to the location or expansion of the airport as it affected the inhabitants of the surrounding areas.

Mr. TOBIN. May I answer that?

I did not intend to convey that we have no responsibility to the people in the district. We have the same responsibility or similar responsibility to the people in the whole district in the same sense that you have to your people in your district.

Mr. CASE. Does that include responsibility with respect to those people living adjacent to an airport that you operate?

Mr. TOBIN. Within the sphere of any other public official. We are guided by the responsible Federal agencies. We follow that criterion set up by the agencies in whom Congress vested the power to regulate the field of air transport. We feel that we have been and are trying to follow out our responsibility.

Mr. CASE. Thank you.

Mr. HINSHAW. I suggest perhaps the port authority likewise holds responsibility to the people of New Jersey and New York in a number of ways, as they operate under laws currently enacted by those two States.

Mr. CASE. I am sure that is true.

Mr. O'HARA. I would assume that the port authority, as the operator of the airport, owes a degree of responsibility to every one of the public who uses the airport as a passenger as well.

Mr. WOLVERTON. Mr. Chairman, I curtailed my examination of the witness to conserve time. I did not cover the subject I was interested in as fully as I would have liked to. Under those circumstances, would there be any objection to my inserting a statement in the record? I would like to make it part of the record, if possible, that is, if we have the time.

Mr. KLEIN. We would prefer to have you make it part of the record by submitting it in evidence, although if it is important to you we still have 8 minutes left.

Mr. WOLVERTON. Thank you. I will read it into the record.

I attach considerable significance to the question of the kind or character of gasoline used by the air carriers in relation to safety of operation. I think it is extremely important, due to the fact that the rules and regulations of the Civil Aeronautics Administration and the Civil Aeronautics Board and the Petroleum Administration for Defense requires certain fixed standards to be observed.

I am anxious to learn first what inspection is carried on by our Federal aviation authorities to make certain that the kind and character of gasoline used is in accordance with the requirements. It is extremely important for air carriers to use the kind of gasoline that will produce sufficient power to give full power performance to the engine. If there is an engine failure it can very easily cause the plane to crash. This is especially true when the plane is taking off from the airfield or landing at the field. These operations are most critical in the operation of a plane. If the engine stalls at either of such times or does not develop the necessary power, the result can be serious. Consequently, there should be the strictest kind of inspection and enforcement of the rules and regulations as to the type of gasoline used.

But my inquiry will be even further than whether there is proper and adequate inspection as to compliance with rules and regulations. I want to know whether the type of gasoline that the Petroleum Administration for Defense—the PAD—has ordered to be used by the air carriers is at fault.

On October 19, 1951, the PAD issued an order that radically changed the component parts of the gasoline to be used by air carriers. This order required a diminished quantity of alkylate and an increased use of tetraethyl lead. The issuing of this order making such a change in the gasoline content was violently opposed by the Civil Aeronautics Administration; the Civil Aeronautics Board; the Air Transport Association, representing the air carriers; the several airlines; the manufacturers of airplane engines; and the oil companies producing aviation gas on the ground it could produce engine failure and jeopardize safety. Notwithstanding the opposition of all these interested parties who are concerned with promoting air safety, the Petroleum Administration for Defense issued the order that made the change.

I cannot say until the investigations of the recent accidents are complete whether this was the cause of the accidents or contributed in any way to them. The gasoline used in these planes may or may not have been of the new formula. Tests are now being made in Government laboratories.

The objection to the use of the new formula gasoline was based mainly on the fact that the presence of the increased quantity of lead in the mixture would materially increase the tendency to create cor-

rosion in the engine, spark plugs, governors and valves, and pipelines, including the dome section of the propellers. Again, I must say that it is necessary to await the result of the investigations by the technicians before it can be said with any definiteness whether corrosion was present in any of the vital parts of the planes that crashed.

The knowledge, however, that corrosion can occur from the use of increased quantities of lead makes it important to determine whether gasoline of the type now ordered by the Petroleum Administration for Defense should be permitted to continue, or changed to a formula that would provide a less likelihood of danger from corrosion and thereby give greater assurance of safety.

The danger created by the order of the Petroleum Administration for Defense and the damage that might follow seems to have been recognized by that portion of the order that provides:

> SEC. 7. Defense against claims for damages: No person shall be held liable for damages or penalties for any act or failure to act resulting directly or indirectly from his compliance with this order, or amendments thereto, so long as this order and its amendments shall remain in force, notwithstanding that this order, or any amendments thereto, or any part thereof, shall hereinafter be declared invalid by judicial or other competent authority.

What was the reason or purpose for such a defense against claims for damages?

I do not want to believe that its effect, if not its purpose, is to eliminate all right to damages suffered as a result of air accidents "directly or indirectly" attributed to the order fixing the type of gasoline to be used. As to this I have asked Secretary of the Interior Chapman for his interpretation of the provision and its effect.

The whole subject is one that should have the most careful examination to the end that what seems necessary to insure safety shall be done.

Mr. KLEIN. I have just one question more, Mr. Tobin.

There has been a great deal of agitation in this area, and not only here but in New York City and throughout the country with regard to the possible closing of airports. I would like to ask you a hypothetical question.

If the Port of New York Authority wanted to keep this airport closed, in the face of the objections of the airlines, the city of Newark, or any of the parties to this agreement, could they do so?

Mr. TOBIN. I have serious doubts about that as to whether you could. I think you would be faced with all kinds of litigation and faced with heavy money damages and you might be faced with various mandatory injunctive procedures to compel you to keep the airport open.

Mr. KLEIN. Am I correct in stating that it could only be done by the mutual consent of all the parties: the public, the Federal Government, the municipal authorities, the airlines, and the rest?

Mr. TOBIN. That is correct.

Mr. KLEIN. Thank you.

I would like to say at this point that the committee appreciates the cooperation given to it by the port authority and the fact that you had all the commissioners here and many of your staff and your records in order to assist the committee in its deliberations. I want to thank you on behalf of the committee and also I want to thank the authorities of Union County for the great help they have given us, and the police

department for their assistance in investigating on the scene of the accidents.

I might leave this note: This is a touchy subject. The emotions of the people are involved and justifiably so, but it seems to me that the problem can only be solved by sanity on the part of everybody concerned. We have a number of agencies involved whose duties are set up by law. If everybody understands that and approaches this problem with the solemnity and consideration it deserves, and this applies to our committee as well, some solution satisfactory, in a measure at least, to all the parties can be worked out—if not to prevent accidents, at least to go as far as human beings can go to prevent any future accidents.

The hearing is adjourned, subject to the call of the Chair.

Mr. HINSHAW. We would like the public and press to know that we are very anxious to get this matter cleared up as quickly as possible and that we would like to continue here, but we have congressional matters that will occupy us for the next three days and then we have to consider the UMT Act and that will keep us away for the next few weeks.

(Whereupon the committee adjourned subject to the call of the Chair.)

AVIATION SAFETY

MONDAY, MARCH 3, 1952

HOUSE OF REPRESENTATIVES, SUBCOMMITTEE OF THE COMMITTEE ON INTERSTATE AND FOREIGN COMMERCE,
Washington, D. C.

The subcommittee met, pursuant to call, at 4 p. m., in room 1334, New House Office Building, Hon. Lindley Beckworth, chairman of the subcommittee, presiding.

Mr. BECKWORTH. The committee will come to order, please.

The committee is pleased that you people, despite your busy schedules, could be here at this hour of the day. We have had meetings this morning and this afternoon already. We have felt that it would be well for the committee to know that which has recently transpired over the past few months in connection with the question of gasoline and the contents of it which is used in airplanes.

From time to time as we have proceeded in our hearings, we have found ourselves coming back to the question of whether or not the change in the content of gasoline or lead in the gasoline could have had any bearing on the question of accidents.

We would like to hear from Mr. C. E. Davis, the Assistant Deputy Administrator for Domestic Petroleum Corporations, Petroleum Administration for Defense, formerly Director of Refining.

Is Mr. Davis here?

Mr. DAVIS. Yes.

Mr. BECKWORTH. Will you come forward, Mr. Davis.

I understand you have a prepared statement.

Mr. DAVIS. Yes, sir. I would like to present a short prepared statement, if I may.

Mr. BECKWORTH. You may proceed.

STATEMENT OF C. E. DAVIS, ASSISTANT DEPUTY ADMINISTRATOR FOR DOMESTIC OPERATIONS, PETROLEUM ADMINISTRATION FOR DEFENSE, ACCOMPANIED BY ELMER BATZELL, ASSISTANT DEPUTY ADMINISTRATOR AND GENERAL COUNSEL, PETROLEUM ADMINISTRATION FOR DEFENSE

Mr. DAVIS. The Petroleum Administration for Defense is the Government agency responsible for the supplies of aviation fuel for the military and essential civil uses. We, therefore, are obliged, in the discharge of these duties, to investigate all possible courses of action. It follows that, when emergency shortages arise, established specifications which restrict supplies must come under careful review.

The over-all supply and demand situation is periodically reviewed by PAD to determine the magnitude of additional production required.

As of October 1, 1951, increased demands on the part of the military and the loss of the entire production from the Abadan refinery in Iran resulted in an estimated shortage in the world-wide supply of high octane number aviation gasoline of 24,000 barrels per day.

Inasmuch as approximately 90 percent of the high octane aviation gasoline production facilities in operation are in the United States, this country was called upon to fulfill that requirement normally satisfied by Abadan production.

The majority of the product from that source went to commercial operations carried on by friendly foreign countries overseas and by the American airline operators in foreign areas.

Actually, the loss of Abadan production dated back to June 1951, but operations were continued in foreign areas largely through depletion of stocks in storage. However, certain airline operations, particularly in the Far East, had been drastically reduced.

Until last October, it had been possible to provide adequate supplies of fuels by means of well-established procedures and without using allocation powers. On October 19, 1951, the Petroleum Administration for Defense issued PAD Order No. 4, placing a floor on the lead content of commercial aviation gasoline delivered for domestic consumption at 4.0 milliliters per gallon and for export at 4.6 milliliters per gallon. This action was taken to overcome a significant portion of the shortage of high octane aviation gasoline mentioned above.

In order to obtain additional supplies of aviation gasoline, the Petroleum Administration, at the same time, also issued PAD Order No. 3. This order required that alkylate and all other key blending components of a similar type required in the manufacture of high octane number aviation gasoline be reserved strictly for that use and required the use of all available raw materials for the production of alkylate, as directed by PAD, in order to insure maximum production of that vital aviation gasoline component.

The possibilities of placing a floor on the lead content of commercial aviation gasoline had been discussed with representatives of the airlines and their industry associations in the fall of 1950 when a shortage of somewhat lower magnitude was being faced. They presented at that time their objections to increasing the lead content of the fuel that they use to the military specification of 4.6 milliliters per gallon. These were carefully considered.

At that time other means—which are still practiced—were available to increase production of aviation gasoline, and it was not necessary to take action in increasing tetraethyl lead content.

The main objections which airline operators have to higher tetraethyl lead content arises from the fact that the addition of tetraethyl lead to fuels causes increased engine deposits. This is true for automotive as well as aircraft engines.

Tetraethyl lead is a compound of lead and hydrocarbons which is vaporized or injected along with the fuel into the cylinders of the engine for the purpose of suppressing knock.

Modern high output automotive and aircraft engines would not be operable with available fuels without the addition of tetraethyl lead.

The fluid used contains scavenging agents which materially reduce, but do not entirely eliminate, engine deposits. The effect of these deposits must be offset by adequate engines maintenance practices which, in the case of increased tetraethyl lead, generally means more frequent overhauls.

The use of high tetraethyl lead content fuels is not new. During World War II, all high octane military and commercial aircraft fuels contained 4.6 centimeters of tetraethyl lead. With this tetraethyl content, it was possible to meet the requirements of aviation fuels with limited supplies of alkylate.

After the war, with large producing capacity for alkylate available, it was possible to replace a portion of the tetraethyl lead in commercial fuels with alkylate.

The main point here is that with the present type engines, we could never completely eliminate the use of tetraethyl lead, and that even though alkylate were not in short supply, it would be necessary to continue to use some tetraethyl lead in order to produce fuels which would perform satisfactorily. This, of course, means that we are discussing a degree of a situation, rather than any specific principle, and that in any case there exists the problem of deposits in engines as a possible result of tetraethyl lead.

Our position, when PAD Order No. 4 was issued in October 1951, was not arbitrary. The reports submitted to the Petroleum Administration during the previous year had shown that approximately 50 percent of the commercial airline operations in this country were then being conducted on fuel containing 4.0 milliliters of Tetraethyl lead per gallon, compared to 3.0 milliliters for the most of the remaining operations.

A large portion of these operations was on the west coast, where the over-all supply situation on aviation gasoline had been very tight and had forced individual refiners to supply higher lead content fuels in order to satisfy demand.

This fact was discussed with the Civil Aeronautics Administration and Civil Aeronautics Board, and there were no data forthcoming from those agencies to indicate that any extraordinary operating problems were being encountered in that area from the use of 4.0 millileters tetraethyl lead fluid.

This connotes that the Pacific airlift, as well as all commercial operations in that area, had been operating satisfactorily on fuel containing the higher lead content for at least a year.

Fuels containing a uniform tetraethyl lead content of 4.0 milliliters per gallon, are now used for commercial operations at all airports throughout this country. For this reason, we believe that neither the fuel composition, which is manufactured to meet specifications, nor the tetraethyl lead content of the fuels, can have any effects which would be peculiar to the recent tragedies at Elizabeth, N. J.

In addition to the long-standing use of considerable quantities of 4.0 milliliters fuel in domestic commercial operations, at the time PAD Order No. 4 was introduced, approximately half of the aviation gasoline for export in the fourth quarter for commercial use in foreign areas was scheduled to contain 4.6 milliliters of tetraethyl lead.

In this connection, PAD has been informally advised by the military services, the high octane aviation gasoline of which specifies 4.6

milliliters tetraethyl lead per gallon, that they never had an accident where tetraethyl was found to be a significant factor.

Additional discussions were held with representatives of the airlines, their industry associations, CAA and CAB, on October 23 and 25, 1951, to consider a request by CAB for a further delay in effecting an increase in tetraethyl lead content of commercial aircraft fuels.

In the face of the magnitude of the shortage of aviation gasoline existing at that time, we did not feel justified in delaying the effective date, October 30, of section 3 of PAD Order No. 4.

Section 3 of PAD Order No. 4 relates to the tetraethyl lead content of commercial aviation gasolines. It had been estimated that approximately 5,500 barrels per day of additional grade 100–130 aviation gasoline would be made available by the application of this order, which was a significant contribution toward relieving the over-all shortage.

It has been agreed with representatives of the airlines that when additional information on this subject is available, meetings will be scheduled to exchange information on any additional operating problems that are incurred by this order, and on increased availability of aviation gasoline resulting from the application of the order. At this writing, no new information has been received.

In summarizing, it is important to describe the alternatives which were open to PAD in October 1951. The world-wide shortage of aviation gasoline was 24,000 barrels per day. And a portion of this shortage could be obtained by the provisions of PAD Order No. 3, and other small increments could be obtained by marginal procedures not previously considered necessary. These steps were not sufficient to produce the supplies of aircraft fuels required for military and essential civilian use. There were only three possible courses of action left open to PAD:

1. Ration civil aircraft fuels;
2. Restrict deliveries to the military;
3. Increase the tetraethyl lead content of civil aircraft fuels by issuing PAD Order No. 4.

Of the afore-mentioned alternatives, PAD considered PAD Order No. 4 as the least objectionable solution to the problem. We fully recognize the significance of increased tetraethyl lead in civil aircraft fuels, but our review of all the evidence led us to different conclusions as to the magnitude of the adverse effects predicted by the airline operators.

For this reason, we were able to make the decision to proceed with PAD Order No. 4 with the full belief that it was in the national interest.

It was also stated, at that time, that as soon as the supply of aviation gasoline was sufficient to meet the essential requirements from military and civilian sources the order would be immediately withdrawn.

There are present indications that the supply position should be approximately in balance by the end of the third quarter of this year, and if there are no significant increases in demand, we believe that such action could be taken at that time.

Mr. Chairman, that completes my formal statement.

Mr. BECKWORTH. Mr. Davis, while these discussions were going on prior to October when the order was issued, were you in on all these discussions, or most of them?

Mr. DAVIS. Yes.

Mr. BECKWORTH. What was your official capacity then?

Mr. DAVIS. Director of the Refining Division of the Petroleum Administration.

Mr. BECKWORTH. I assume that you were one of the primary men in PAD that had the responsibility of reaching the decision, if not the primary man?

Mr. DAVIS. That is right. It was in my division.

Mr. BECKWORTH. As you recall the discussions back there, was there a great deal of time devoted to the question of whether changes would have to be made in the maintenance of engines and the checking of them?

Mr. DAVIS. The detailed changes that would have to be made?

Mr. BECKWORTH. Yes.

Mr. DAVIS. No, sir.

Mr. BECKWORTH. Did you get the idea that it would be a very serious problem?

Mr. DAVIS. We did not view it as a serious problem for this important reason: 50 percent of the aviation gasoline being delivered to commercial airlines in the United States for the preceding year contained 4 cubic centimeters of tetraethyl lead which was the level at which PAD Order No. 4 was directed.

It only raised the remaining 50 percent to the level of the other 50 percent for the past year.

Mr. BECKWORTH. You stress there 50 percent of the gasoline being delivered to domestic companies; is that not right?

Mr. DAVIS. Well, for the airlines in the United States, all commercial airlines.

Mr. BECKWORTH. The significance as between domestic and foreign is really not important as to how much gasoline is being used or not?

Mr. DAVIS. It is important to this extent: That exports are shipped out of the United States to supply foreign airlines and American airlines operating in foreign countries.

Mr. BECKWORTH. Let me put it this way.

I believe you said the really significant fact is that at the time the question of issuing the order was being discussed, 50 percent of the gasoline already had that high lead content.

Mr. DAVIS. That is correct.

Mr. BECKWORTH. Does that mean that 50 percent of the gasoline used by American companies, whether they were buying foreign or domestic, had that amount of lead in the gasoline?

Mr. DAVIS. If they fueled at airports in the United States.

Mr. BECKWORTH. I beg your pardon?

Mr. DAVIS. If they fueled their airplanes at the airports in the United States. That is what is meant by domestic commercial.

Mr. BECKWORTH. In checking into that particular situation, did you find that most of the miles they flew were miles flown on gasoline such as you are describing?

Mr. DAVIS. It was about equally divided, Congressman, between the 3 cubic centimeter material and the 4 cubic centimeter material or milliliters, which is the same thing.

Mr. BECKWORTH. To put it another way, did you find that a good many of the miles flown by American companies were flown using gasoline that was obtained outside the country, or not?

Mr. DAVIS. No, not from the United States. The production of aviation gasoline is over 90 percent located in the United States and the airlines throughout the world draw their supplies either from the United States or from the remaining production outside of the United States, which is less than 10 percent.

Mr. BECKWORTH. Did foreign users make any unusual demands for certain kinds of gasoline?

Mr. DAVIS. With the closure of the Abadan refinery, of course that placed a great additional burden on the supplies from the United States to supply the free countries of the world and make up the deficit created by the shut-down of that plant.

They placed their demands on the United States.

Mr. BECKWORTH. When they ask for gasoline do they in general specify a particular content of lead, or not?

Mr. DAVIS. They are quite willing to take whatever they can get. The 4 cubic centimeter material in that 50 percent of the commercial distribution in the United States was largely on the west coast of the United States, as I mentioned before.

Some airlines operated out there exclusively on 4 cubic centimeter material. Others operated on 4 cubic centimeters when they were fueling in San Francisco; they might operate on 4 cubic centimeters in Chicago, and 3 cubic centimeters in New York, or at different airports throughout the country they would get either 3 or 4 or 3½ cubic centimeters, depending upon the points at which they were refueling and the supply contracts which were available and which arranged for the delivery of fuel at those airports.

But out of the whole total of the country, half of the gasoline was 4 cubic centimeters. If you put it in a common pot, it would work out about 3½ cubic centimeters.

Mr. BECKWORTH. How long had it been 4 cubic centimeters?

Mr. DAVIS. For about a year or more; since before the Korean situation.

Mr. BECKWORTH. PAD felt that ample experience had been acquired in connection with the 4 cubic centimeters?

Mr. DAVIS. Most of the off-shore gasoline in California was 4 cubic centimeters or higher.

The military has exclusively received 4.6 cubic centimeters per gallon.

Mr. BECKWORTH. Do you have any questions, Mr. Wolverton?

Mr. WOLVERTON. Mr. Chairman, as previously indicated, I have been greatly concerned over the possible detrimental effects that might arise from the standpoint of safety in the use of the increased quantity of ethyl lead. I communicated my fears to Secretary Chapman.

I have before me the letter which I addressed to him, which I would like to make a part of the record in order that his reply might also be appropriately made a part of the record.

(The letter is as follows:)

HON. OSCAR L. CHAPMAN,
Secretary of the Interior, Department of the Interior,
Washington, D. C.

DEAR MR. SECRETARY: I am a member of the House special committee to investigate the cause of recent air accidents at Elizabeth, N. J. and to make such

recommendations as may be deemed necessary to promote air safety. In connection with my duties as a member of such committee, I have been making inquiries as to kind or type of gasoline used by commercial air carriers.

I find that PAD Orders 3 and 4, issued October 19, 1951, require for certain carriers a 4.0 tetraethyl lead content and others, 4.6. It has also come to my attention that this change in the tetraethyl lead content from that which was previously the case and the decrease in alkylate content was opposed by CAA, CAB, ATA, together with other interested parties, including manufacturers and producers of aviation gasoline, on the ground that it might increase engine failure and jeopardize safety.

In order that I may be fully informed on this subject, would it be possible for you in your capacity as Secretary, or as head of the Petroleum Administration, to make available for me for use before the committee a copy of the transcript of the meeting of the National Petroleum Council held September 2, 1950, especially with regard to remarks alleged to have been made by Mr. Rentzel and Mr. Brown relative to aviation gasoline, together with expressions of opinion made to you in 1950 by CAA, CAB, engine manufacturers and other interested parties when the order was first under consideration, or later in 1951 when the order was finally considered and adopted with the proposed change?

I am also deeply concerned as to the purpose and effect of that provision of the order reading as follows:

"Defense against claims or damages. No person shall be held for damages or penalty for any act or failure to act resulting directly or indirectly from his compliance with this order or amendments thereto so long as this order and its amendments shall remain in force, notwithstanding that this order or any of amendments thereto or any part thereof, shall hereafter be declared invalid by judicial or other incompetent authority."

I will appreciate any expression from you as to the purpose and effect of this provision and particularly as to whether the broad language used will preclude claims for damages for death, personal injury, or property growing out of an incident to the air crashes at Elizabeth, N. J.

I trust you will find it convenient to make an early answer. It will be appreciated.

A few minutes ago, Mr Chairman, I received under date of March 3, an answer to the communication which I have just read.

As you will notice, it is a very voluminous document. It undoubtedly endeavors to answer the inquiries that I set forth in the letter, but being as voluminous as it is, in the few minutes that it has been in my possession I have not had an opportunity to give it the study that it is entitled to have, and which would be helpful to us for it to have.

As I have gone through it quickly, I have noticed some matters that seem to bear out the opinions that I had when I wrote the letter to Secretary Chapman, that relate particularly to the safety feature.

Will you tell me, Mr. Davis, whether the CAA in 1950 when the order was under consideration, and in 1951 when it was again under consideration and finally adopted, objected to it?

Mr. DAVIS. They objected to the order in 1950, and they objected to the order having been issued in 1951.

Mr. WOLVERTON. Upon what ground did the CAA object?

Mr. DAVIS. They objected on very extensive grounds, that is, maintenance of aircraft, the operation of aircraft, the safety of operation of aircraft.

There were objections from CAA, CAB, the Air Transport Association, and industry representatives.

Now, I have stated that we gave full consideration to those objections, and I also mentioned that at the time most of the objections were filed in 1950 we were considering increasing the tetraethyl lead content to 4.6.

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We also at that time were considering raising the volatility of the gasoline.

Most of the letters in our possession relate to both those conditions, the increase in tetraethyl lead content to 4.6 and the increase in volatility.

We stopped short of 4.6 in October 1951 by raising the tetraethyl lead content only to the level of half of the gasoline being sold for commercial use in the country. We did not raise volatility.

Now it is very difficult for PAD, and we have considerable support in other directions, to believe that when half of the operations, and the west coast almost exclusively, could operate on 4 cubic centimeters material, that the other half of the country's operations would have any significant change in the safety of their operation.

We recognize that for those people who were using the lower tetraethyl lead content, that they would have to incur greater maintenance expense. They would have to perhaps overhaul their engines at shorter intervals.

But as far as safety is concerned, it is very difficult to understand why the safety of operations in all airline business which was using the 4.0 cubic centimeters could not be equally effective in the airlines using 3 cubic centimeters.

Mr. WOLVERTON. Let us come back to my question, which was: Did the CAA object?

Mr. DAVIS. Yes, they did.

Mr. WOLVERTON. Did the CAB object?

Mr. DAVIS. They did.

Mr. WOLERTON. Did the ATA object?

Mr. DAVIS. Yes. I stated they objected, too.

Mr. WOLVERTON. Did any of the airlines individually object?

Mr. DAVIS. Yes.

Mr. WOLVERTON. Did manufacturers of engines object?

Mr. DAVIS. Yes.

Mr. WOLVERTON. Did a representative of Pratt Whitney object?

Mr. DAVIS. Yes. They are manufacturers of engines.

Mr. WOLVERTON. Now, who favored it outside of PAD?

Mr. DAVIS. Well, we must consider that at the time we were short 24,000 barrels a day of aviation gasoline. We had urgent demands from the military services to meet their requirements. We had urgent demands to meet the essential civilian and military requirements in friendly foreign areas.

We had exhausted all other means of increasing production.

We felt that the proposed step in PAD order No. 4 was a reasonable and sound thing to do and that the facts supported our doing that, keeping in mind that we stopped at 4 cubic centimeters, that we did not go to 4.6.

Now, military gasoline has always been 4.6 in recent years. In all their transport and military operations, they have used high lead content and have advised us that they consider the gasoline entirely safe.

I would like to quote in that connection, if I may, from a letter we received from the United States Air Force signed by General Farthing, which states as follows:

> It is difficult for the Air Force to compare the effects of low lead content in aviation fuel with that of high lead content in aviation fuel on the basis of fuel

consumption, since the Air Force has used military fuel which contains a high lead content. High safety standards are maintained through preventive maintenance procedures, which are covered in Air Force Technical Order 01-1-436, copy of which is attached for your information. This safety record is best borne out by the experience of the Military Air Transport Service which operates the largest cargo and passenger air fleet in the world, using a 4 to 4.6 milliliter lead content fuel for all flights, including extensive overwater operations. They have established an enviable safety record.

Commercial airlines operating under Government costract are supplied in most cases with military specification fuel generally containing a high lead content, apparently without impairing their safety.

Now, also supporting PAD's position is the experience of the United States Navy. Quoting from their communication to us:

The transport type aircraft of the Navy are operated under procedures closely approximating those used by the commercial airlines. The engines are operated basically in accordance with the manufacturer's approved operating procedures. The Navy and the Air Force jointly developed a constant power cruise patrol procedure for more dependable operation of the aircraft. It is our understanding that most airlines have adopted this procedure with minor changes.

In view of the above, the Navy considers that so long as the prescribed operating procedures are followed, the use of fuel reaching the marginal limit of the military specifications does not compromise flight safety. It is agreed that a slight increase in fuel consumption and engine maintenance is to be expected.

That ends my quotation of those two letters, Congressman Wolverton.

Mr. WOLVERTON. What was the date of those letters?

Mr. DAVIS. I would like to mention, Congressman Wolverton, that my statement that I gave earlier was taken substantially from the letter which you just received from Secretary Chapman, and all of the attachments to this letter are part of my presentation.

The letter from the Navy was dated October 19, 1950; the letter from the Air Force was dated December 19, 1950. Now that was at the time when we were seriously considering going to the higher content of 4.6.

Mr. WOLVERTON. Each of these agencies or individuals who registered objection did so on the basis that it did have a tendency to deteriorate safety, did they not?

Mr. DAVIS. Yes. Any factor influencing the engine deposits is a factor that influences safety. Engine deposits, of course, are present in all aircraft engines and will always be so long as they are operated, either from fuel or lubricant factors.

The difficulty in determining that question on the basis of their objections is the degree of compromise in safety represented by the action taken by PAD.

The deposits can be taken care of by proper maintenance, as the Air Force has stated in their communication.

Mr. WOLVERTON. Assuming that there might have been a difference of opinion, what justification did you feel that PAD had to take the opinions that were expressed in those two letters that you have read, as distinguished from the objections that had been made by CAA, CAB, ATA, individual lines, and manufacturers of engines?

Would you say that the weight of experience was in favor of the letters that had been written by the two military services?

Mr. DAVIS. That is a hard question to answer specifically. The answer as we viewed it on the basis of the practice then in effect where the commercial airlines were already using 4 cubic centimeters mate-

rial in half of their operations in the United States, would seem to convince any objective person looking for increased production that the remaining half could be raised to the level of the production which was presumably being used satisfactorily and thereby gain increased production of 55 barrels at a time when production was extremely short.

Mr. WOLVERTON. What I am trying to ascertain is what justification existed at the time when the order was made that would justify ignoring the experience and the advice based upon that experience that had been made known to the PAD by the different agencies of government and industry that I have mentioned, as well as the individuals who were connected with them or with the airlines that were continually operating and therefore undoubtedly in a position to know the effect of increased lead?

Was it the exigency of the occasion that required you to take somebody else's opinion, or was it because after giving consideration to those who have opposed it and those who favored it, which you have read to us, that you concluded the CAA, CAB, and the airlines and the engine manufacturers were not as well qualified to express opinions that should have an influence upon you as the two military services that had communicated with you?

Mr. DAVIS. No, we considered both of those. The exigencies of the situation were great.

Mr. WOLVERTON. What was the situation that justified your department ignoring the advice, counsel, and the opinions that had been expressed by all of the agencies and individuals to whom I have referred?

Mr. DAVIS. We did not ignore the advice, sir. We gave weight to all of the advice that we could get, and all the facts that we could get. We could not supply the required amount of aviation gasoline without trying to balance the production requirements, the worldwide demand, the military needs, in a time of mobilization, with the over-all conditions under which we were judging the case.

Now, we had support, as we say, from what we could consider sound technical organizations such as the Air Force and Navy, which I have mentioned.

The National Advisory Council for Aeronautics have reviewed this subject of lead content and have indicated to us that they feel that aircraft engines can satisfactorily operate on higher lead content.

If you like, I could read you resolutions from NACA on that subject supporting this.

There is conflict, there is no doubt about it, in this field about which we are talking. But we have been confronted with a serious problem in trying to reconcile a short production position with a reasonable approach to commercial use.

I have stated that we have a history of 50 percent of the gasoline having the lead content which we prescribed in PAD order No. 4.

Now, no airline or no manufacturer has presented to PAD evidence that would show that the operations of that 50 percent of the use are unsafe.

Mr. WOLVERTON. Is it not true that notwithstanding the opinion that had been expressed and the advice that was given by those whom I have mentioned, that the necessities of the case required you to do it and for

that reason you ignored their opinion and took the opinion of the persons that would enable you to do the thing you wanted to do?

Mr. DAVIS. I think in any case where you do not follow the recommendations, you have ignored an opinion. But we have tried to base it on a broad examination of the problem from the standpoint of national defense and national interest and we feel that we reached a conclusion which was sound and in that interest.

Mr. WOLVERTON. You first considered it in 1950?

Mr. DAVIS. That is correct.

Mr. WOLVERTON. Then you withheld making the order at that time?

Mr. DAVIS. We did not issue it.

Mr. WOLVERTON. Was that due to the adverse opinions that were presented to you?

Mr. DAVIS. I can say that it was probably more likely due to the fact that, first, the shortage was much less at that time in barrels per day than it was in October 1951.

Mr. WOLVERTON. What increased the shortage in 1951?

Mr. DAVIS. There was a greater increase in the use of military and commercial aircraft a greater increase in demand throughout the free world increased the shortage in 1951.

The production and demand more than doubled the first year after Korea.

Mr. WOLVERTON. Did the closing of Abadan have a direct bearing?

Mr. DAVIS. It had as I mentioned previously a very direct bearing since all the production of that refinery was lost to aerial commerce throughout the world.

Mr. WOLVERTON. As a result of that, has it become necessary for producers in this country to send that type of gasoline elsewhere which otherwise could have been used in this country and would thereby have eliminated the necessity of making this order?

Mr. DAVIS. Yes. This country supplied the aviation gasoline which was lost by the shut-down of the Abadan Refinery.

Mr. WOLVERTON. To whom did we supply it?

Mr. DAVIS. To countries and airlines all over the free world. Over 90 percent of the manufacturing capacity in existence for aviation gasoline is located in the United States.

Consequently, there is only one place to turn for aviation gasoline.

Whether the flying is in Formosa, India, Australia, or the Middle East, it substantially comes from this country.

Mr. WOLVERTON. Then it would seem as if our safety or lack of safety depends on demands elsewhere rather than at home.

Mr. DAVIS. I think that is true, that the safety of this country depends on things that happen in the rest of the world in petroleum, as well as in other fields.

Certainly, petroleum and aviation gasoline production in particular is centered in this country.

Mr. WOLVERTON. How soon after this order was made did that type of gasoline go into use by the airlines in this eastern area?

Mr. DAVIS. The order was effective for deliveries after October 30. That time was to permit the turn-over of stocks in the hands of blenders and refiners.

So that within a very few weeks, depending on the location, the airlines should have been operating on that gasoline.

Mr. WOLVERTON. Would they have been operating on it in December last?

Mr. DAVIS. They should have been operating on it by November, although it varies, depending on whether the gasoline comes from south Texas by tanker and to a tank on the east coast and to a truck which fills the plane. That is the supply line that varies with every location.

Mr. WOLVERTON. Do you know whether the airplanes that crashed in Elizabeth had used this type of gasoline?

Mr. DAVIS. I have no knowledge on that subject.

Mr. WOLVERTON. Would your agency be interested in knowing whether the effects that had been mentioned to you as likely to follow the use of this gasoline had in fact been the cause of those accidents?

Mr. DAVIS. Our agency is always interested in those facts. We do not have the means to acquire those facts. That is in the hands of other agencies like the CAA.

Mr. WOLVERTON. In view of the fact it had been argued before the agency that this change should not be made because of the safety factor, when it became observable, not only at Elizabeth, but other places that there had been engine failures, you do not think that should have created any interest on your part to determine whether it could have been in any way due to the type of gasoline that had been used?

Mr. DAVIS. We are quite sure that the agencies of government responsible for the investigation of aircraft failures will certainly examine the fuel conditions surrounding the crash, the fuel factors that may have been present.

Mr. WOLVERTON. Then you are depending on them the same as this committee is without showing any interest yourself in the subject?

Mr. BATZELL. Maybe I can help you. My name is Elmer Batzell. I am the Assistant Deputy Administrator and general counsel for the Petroleum Administration. On this particular phase I merely want to say that throughout the discussions, which have lasted, as the record shows, something over a year, we had asked and were depending upon, as Mr. Davis has said, these other agencies to provide the additional technical data to follow through on the exact gasoline used by the carriers in their every-day operations. In general I think it would be fair to say that probably most of the commercial flights in the United States from the early part of December, including necessarily, of course, the flights in Elizabeth, were flown in part on this gasoline of 4.0 milliliters tetraethyl lead.

Mr. WOLVERTON. Do I understand, then, that you are more willing now to take the opinion of the CAA and the CAB upon further study by them than you were in the fall of last year or in 1950?

Mr. BATZELL. No; I think that the problem, as Mr. Davis pointed out to you before, is one where we took into consideration a conflict of expert testimony upon the exact and precise effects of the inclusion of additional quantities of tetraethyl lead in a gallon of gasoline. The military, as the military has pointed out and I think the airlines themselves will agree, have flown probably the largest air freight and passenger service in operation throughout the world through their MATS service. We took into consideration their views of the consequences of additional quantities of tetraethyl lead in the gasoline. Their finding was in effect that it did not adversely affect safety.

On the other hand, there were certain airlines which felt, mostly as a prospective matter rather than a retrospective matter, that the inclusion of additional quantities might affect safety. There is the still further conflict of expert evidence that certain of these airlines had been flying on this 4.0 milliters of lead throughout the period and for the preceding year. It is this area of conflict of expert testimony which is germane here.

Mr. WOLVERTON. The testimony which you have given seems to indicate to me that you anticipated that a further or additional study would be made by the CAA or the CAB, and that you were depending on them to do that, is that right?

Mr. BATZELL. We certainly anticipated two things——

Mr. WOLVERTON. I am asking if it isn't the case that you are depending upon them. What would they do now that would justify your taking their advice when they have previously given you their advice based upon their many years of experience.

Mr. BATZELL. Let me point out to you, if I may, one aspect of this which I mentioned before. Their views were what I might call prospective. That is, this might occur. They were not based upon adduced evidence from engine manufacturers or anyone else as to precisely the relationship.

Mr. WOLVERTON. I do not want to interrupt you and you may go on, but do I understand you mean that they should be able to show you cases where there have been crashes and that was due to that, and that you wanted to see or know of crashes before you would take their opinion?

Mr. BATZELL. Oh, no. I obviously have not stated my position well. What I was talking about was as to the technical effect of increased deposits in the engines and the relationships of that to potential crashes or to engine failures absent crashes. I am talking of the extremely technical point, not whether or not a crash exists. There are, of course, certain types of aircraft that have had a history of difficulties with engines regardless of the fuel.

Mr. HINSHAW. Mr. Chairman, if the gentleman would yield to me for a minute, I would like to quote a couple of lines from page 192 of the American Aviation Daily for October 4, 1951 [reading]:

> The United States Navy is testing a new fuel additive which promises to minimize fouling of aircraft spark plugs and make possible using greater amounts of tetraethyl lead without damaging effects.

Then further on:

> The United States Air Force has changed its specifications to provide for a higher lead content and is already experiencing trouble directly attributable to lead fouling.

How do you account for that before October 4, 1951?

Mr. DAVIS. That is incorrect, sir, as a statement. The Air Force has used 4.6 centimeters of lead continuously since before the last war in all their military gasoline.

Mr. HINSHAW. In all their military gasoline?

Mr. DAVIS. Unless——

Mr. HINSHAW. I snppose some of these numerous crashes that the military have had lately can be attributed to the use of high content of tetraethyl lead. They have had a crash every day or so.

Mr. DAVIS. They say, of course, that they investigate all those crashes thoroughly, and they have not indicated to us—in fact, to the

contrary—that they have determined that tetraethyl lead was a significant factor in any crash.

Mr. HINSHAW. One more interruption if the gentlement from New Jersey will permit. I think it is pretty well understood that, when an airplane has crashed and burned, it is pretty difficult to find out what might or might not have been in the engine that caused, let's say, the failure of that engine. The temperatures are quite high, and the burning is over a long period of time. I do not know whether you can ever find that out. I would like to ask you this question: Did you say that the Military Air Transport Service used military-type gasoline or commercial-type?

Mr. DAVIS. The military type, containing 4.6 cubic centimeters instead of the commercial 4 cubic centimeters.

Mr. CARLYLE. What did I understand your name to be?

Mr. BATZELL. Batzell, B-a-t-z-e-l-l.

Mr. CARLYLE. Mr. Batzell, did I understand you to say that there are manufacturers of aircraft engines operating in this country today that have a record for an unusually large number of accidents?

Mr. BATZELL. No, sir. What I said was this: that there had been experiences with certain types of engines which in certain phases had apparently gone out for on reason or another; that those reasons were not necessarily directly related or indirectly related to the type of fuel that was used. There was a multiple series of factors, and I know of my own knowledge generally today of no such type of instance. I was thinking of a couple of years ago.

Mr. CARLYLE. I did not understand that to be the statement that you made just a few minutes ago. Is that the same statement that you made a few minutes ago?

Mr. BATZELL. That was the statement I was endeavoring to make: yes, sir. I would be very glad for the reporter to read the record back. I was not intending to state otherwise.

Mr. WOLVERTON. To emphasize this, is the reason I am dwelling so much on the hearing that was held by PAD. I have before me a transcript of that hearing in which this took place. Mr. Bruce K. Brown is speaking, addressing his remarks to Mr. Rentzel. [Reading:]

> Wouldn't it be preferable on a temporary basis to use less gasoline in the civil airlines and keep it at 3 cubic centimeters, or would you rather run on 4.6 for a couple of months until we get organized?
>
> Mr. RENTZEL. You are asking only the temporary answer to the problem.
>
> Mr. BRUCE BROWN. Yes. You brought it up, and I am asking a question on it.
>
> Mr. RENTZEL. If it came down to a question, certainly I would decide to the side of safety anytime. My answer to it is that I would prefer to see a reduction in the amount of gasoline rather than a reduction in the amount of safety anyday. That is my job.

That is a pretty strong statement; is it not?

Mr. DAVIS. That is.

Mr. WOLVERTON. Did you give any opportunity for the airlines to elect what they would rather do?

Mr. DAVIS. At the time we had the order issued we discussed the alternative of rationing. The shortage that existed at that time would have curtailed the civilian airline availability of gasoline over 25 percent. There was no indication on the part of the people who were discussing it in October 1951 that rationing would be preferable

to the course that we were pursuing. I mentioned in the statement that I made that we had three alternatives. The first was rationing. We considered that there was no indication of a willingness on the part of the industry to curtail their operations, and I think today that on the level of 4-cubic centimeter material the industry would undoubtedly prefer the order as it exists, as a temporary measure, to a curtailment of operations.

Mr. WOLVERTON. Mr. Chairman, I don't know just how to do it or the procedure that should be followed. There are a number of questions that I would like to ask, based on the amount of material that I have before me and particularly growing out of the reply which the Secretary of the Interior has sent to our committee in which there appear communications from outstanding authorities on this subject. I hardly know how to proceed in the short time that is at our disposal to bring this out the way it should be brought out and have it spread on this record.

For instance, I see General Arnold in the audience. I see some others who are mentioned in this correspondence, who expressed themselves very plainly and very strongly as to the dangers that would come from the use of increased tetraethyl lead and the tendency it would have to produce corrosion in engines, governors, valves, ducts, the dome of the propeller, etc. I think we have had enough testimony already to indicate that PAD felt justified in accepting the opinion of certain witnesses from the Navy in the form of letters, and, as it would seem to me, overlooking the experience that had been gained over many years of active service by men engaged in aviation, both in a military way and in a commercial way, together with overlooking or ignoring the opinion of those who are engaged in the manufacture of engines.

How do you wish to proceed? Shall we go on questioning this witness, or would you like to hear something from, we will say, General Arnold, the representatives of the Pratt & Whitney concern, and Mr. Tipton as to the position of the ATA in the matter? In the short time that we have, what do you suggest?

Mr. BECKWORTH. The question of time is important, Mr. Wolverton, because, as you know and as the committee knows, we have considerable business tomorrow before the House. I am wondering if the Air Transport Association, of which I see two representatives, Mr. Tipton and General Arnold, would have a brief statement that you could make at this time, indicating your position on this as the matter is being discussed.

General ARNOLD. My name is Milton W. Arnold, vice president of operations and engineering of the ATA. In answer to your question, I will be very happy to follow whatever you and the committee desire; but, Mr. Chairman, in a problem so complex as this, I would suggest that it will take at least 15 or 20 minutes anyway. I hate to try to get into a problem like this in 5 or 10 minutes, Mr. Chairman.

Mr. O'HARA. Mr. Chairman, I would suggest, in the light of this rather long reply which Mr. Wolverton has received, he obviously has not had a chance to go over it so that he can examine this witness. Would it be advisable to postpone further cross-examination?

Mr. WOLVERTON. Mr. Chairman, I do not want to complicate the situation any; but, as you see from my letter, I raised a further ques-

tion as to the reason, the purpose, and the effect of that very unusual provision in the order which is entitled "Defense Against Claims for Damages." I would like an opportunity to go into that to see what the purpose of it was. Maybe the attorney feels that he should be the one to explain that situation.

Mr. BECKWORTH. I wish to state that you will have an opportunity to explore that. In view of the brevity of the time we have this afternoon, I feel it might be helpful to the committee in understanding this question from more viewpoints than one if we had General Arnold or Mr. Tipton to state in 15 minutes that which you have in mind, with the understanding, of course, that the committee will have an opportunity to question you further, Mr. Davis, and you too, Mr. Batzell, representing the PAD.

Mr. DAVIS. Mr. Chairman ——

Mr. BECKWORTH. Likewise, it would give perhaps more meaning to this very exhaustive document which has been sent to Mr. Wolverton.

Yes?

Mr. DAVIS. We are prepared to answer all the questions you have, and I particularly want to introduce Col. W. J. Worcester, who has been assigned to PAD as aviation officer by the military during this critical period of aviation shortage.

Mr. BECKWORTH. We will expect to hear him later. We won't ask him for any statement now. General Arnold?

Mr. O'HARA. May I ask one further question: Are PAD Orders 3 and 4 still in force and effect?

Mr. DAVIS. They are both still in effect.

Mr. BECKWORTH. May I ask this brief question, because it has been mentioned several times. You mentioned that the shortage "appeared to be" as of the date you referred to. Did that shortage work out to be what you anticipated it would be?

Mr. DAVIS. We have been short continuously.

Mr. BECKWITH. Was it greater than you thought it was?

Mr. DAVIS. Yes, although in volume we have not had the total demand that was anticipated at that time, our production has not yet exceeded the requirements coming from military and civilian sources. You see, 24,000 barrels a day was the estimated demand on which we issued the order. We have not yet met the total demand, and for the next two quarters we estimate that the shortage will continue to be in existence. It will probably approximate a million barrels of 100-octane aviation during the two succeeding quarters, the second and third quarters.

Mr. HINSHAW. Mr. Davis, do I gather from you that this 20- or 24-thousand-barrel shortage, whatever it is, of aviation gasoline, is the quantity of aviation gasoline that was produced at the Abadan refinery?

Mr. DAVIS. No; the Abadan refinery produced a total of 18,000 barrels a day.

Mr. HINSHAW. Of aviation gasoline of what quality?

Mr. DAVIS. 100 octane and higher.

Mr. HINSHAW. Was that the type with high content of tetraethyl lead?

Mr. DAVIS. It was all kinds, but on the basis of 4.6 cubic centimeter I think the calculations gave production of 18,000 barrels a day.

Mr. HINSHAW. How much of the normal 3-cubic-centimeter tetraethyl-lead gasoline did they produce before?

Mr. DAVIS. I don't have the breakdown of those figures. I can't answer that.

Mr. HINSHAW. There is no way to determine what actual shortage of the 3-cubic centimeter lead type gasoline was caused by the Abadan refinery shut-down?

Mr. DAVIS. The total gasoline at 100 octane equivalent was 18,000 barrels from Abadan.

Mr. HINSHAW. That is 100 octane equivalent, using 4.6 cubic centimeter of lead. Can you translate that into what they were producing with respect to the 3 cubic centimeters lead content of gasoline, 100 octane?

Mr. DAVIS. I don't have the distribution of gasoline on 3, 4, and 4.6 from that refinery.

Mr. HINSHAW. Actually, were they turning out the 3-cubic-centimeter content aviation gasoline or were they turning out the 4.6?

Mr. DAVIS. I think they were manufacturing both grades, according to their customers' requirements.

Mr. HINSHAW. Where were they shipping that gasoline? Did any of it come here?

Mr. DAVIS. Oh, no. Largely in the Eastern Hemisphere. Europe, of course, was supplied substantially from there, and the Far East and the Middle East. Of course, they were supplying their customers throughout the world, except the United States. I think it is doubtful that any of it came to the Western Hemisphere.

Mr. HINSHAW. I am just trying to find out how much of the 3-cubic-centimeter content high-alkylate gasoline will be required to be replaced among these various so-called friendly nations of the world, which made it necesary for us to reduce 24,000 barrels, or whatever the figure is, of that type of gasoline in this country.

Mr. DAVIS. I am afraid I don't have that information, sir.

Mr. HINSHAW. I would like to have that supplied for the record.

Mr. O'HARA. May I follow that with one question: Would you not assume that all of those who were supplied by Abadan are now being supplied by us, or are they being furnished from other sources besides the United States?

Mr. DAVIS. There are no new sources. Largely, the Abadan production has been made up by production in the United States, because the production outside the United States, which is relatively small in volume, was already in operation and continued in operation. So, it is a transfer of the demand from the Middle East to the United States for that aviation gasoline, largely. Petroleum has been increased as much as it could in other areas, but the potentialities were very low.

Mr. BECKWORTH. Thank you. We will expect to have you back.

General Arnold, will you take the stand, please.

You may proceed.

STATEMENT OF MILTON W. ARNOLD, VICE PRESIDENT, OPERATIONS AND ENGINEERING, AIR TRANSPORT ASSOCIATION OF AMERICA, WASHINGTON, D. C.

Mr. ARNOLD. Mr. Chairman and gentlemen of the committee; my name is Milton W. Arnold, vice president of operations and engineering of the Air Transport Association, which is a trade organization representing the United States scheduled airlines, and a majority of the industry are members of this organization.

Gentlemen, from my background, I have had intimate knowledge of this problem since it first arose in 1950 soon after the outbreak of the Korean situation. As Mr. Davis and Mr. Batzell mentioned, the question in regard to the problem was promulgated to the industry in 1950, at which time he has reiterated the problem that the proposal of increasing the lead content to 4.6 was delayed. In September 1951 we understood from indirect sources that the PAD at that time had considered the problem of increasing the lead content again. Through discussions with the PAD we learned that they were actively considering this problem. The result was that the Civil Aeronautics Administration and the Civil Aeronautics Board and ourselves and the engine manufacturers, through informal discussions with the PAD, requested that we discuss this problem before any action was taken.

I think before going into the details of the particular problem I would like to bring you the background of the over-all problem of lead and its general effect as the airlines feel that such a problem presents itself.

Gentlemen, I think it would be a little bit beyond the pale of common sense to assume that the airlines as organizations would insist that gasoline with a high lead content would have no deleterious effect upon engine operations when just the opposite has been their experience. It would seem also illogical that the airlines, and the engine manufacturers supporting them, would contend that we are concerned about an increase in lead content if we didn't feel that that problem was justified. In other words, why should we take a stand against an increase of lead content in gasoline if we did not believe honestly and feel that factually we had information to contend that it did have a serious effect upon the operation of engines and components. We can go into considerable detail in that problem. Pan American Airways probably has led all interested parties in this because of their 25 years' experience. They have probably had some of the most capable people in studying engine operations. Our whole program in air transportation has been to increase the reliability of an engine, to increase the available horsepower there, and in case of failure to be sure that the other remaining engines maintain their degree of reliability, and to do anything which we could to do that. That is the objective.

The experience has been that, with the present types of engines varying in different categories, the consumption depends entirely upon the various components, the compression, the horsepower. It is a very complex problem as to determine exactly the amount of effect that the amount of lead will have on each engine.

To clarify the point, I would like to give an example, if I may—as I say, we think we are unanimous in this opinion—of the seriousness of increase in lead content. On the idea that others may not have the

same opinion, I would like to quote from a letter from the Esso Export Corp., dated September 18, 1951, to Mr. Melvin Case, Supply and Distribution Subcommittee of the Foreign Petroleum Supply Committee, 270 Park Avenue, New York City; signed by Mr. A. R. Ogston, head of the technical service division. Mind you, they are manufacturers of fuel, and exporters.

> Three cc. quality is still being supplied to United States domestic airlines and other customers by some of the major oil companies. It is to be noted that if the lead content of these domestic supplies were raised to somewhere between 3.25 and 3.5 cc. about the same gain in production could be achieved as in the case of raising the foreign supplies from 4.0 to 4.6.
>
> What is important is that the addition of 0.25 to 0.5 cc. at the 3 cc. level would do very little harm, whereas 0.6 cc. increase over 4 cc. is an altogether different matter and will, according to our major airline customers and Pratt & Whitney Aircraft, jeopardize operating safety.

That is a letter from a manufacturer of fuel. We could go for hours and give information in regard to our feeling.

I think in all justice to the PAD order we realize that the final PAD Order No. 4 did not go as far as was originally anticipated in 1950, nor was the volatility affected. Yet we think that possibly, as the letter as quoted here, one of the most serious problems is the increase of 4.0 to 4.6, which is in the PAD for export, which requires all international operators, with the exception—and the waiver is provided of—the 4360 engine, which may still use 3.0.

I would like also to make a mention of a general misunderstanding of some of the facts that exist between ourselves and the petroleum administration, which is possibly understandable, but, gentlemen, if I may summarize, our feeling is that as representatives of the carriers we think we are rather firm with the complete unanimous agreement of all carriers who operate and who have had a number of years of experience, plus the engine manufacturers, that increase in lead is a serious probelm. We cannot put ourselves in the serious position of judging the seriousness of the increase as it affects national defense. That is a problem for the Munitions Board and other. So I would like to come to the point of the increased use of lead as it affects our operation, and I believe that we are justified, our people having operated aircraft for a number of years, to know what those effects are as well as humanly possible.

Just before the PAD Order No. 4 was released there was some informal discussion with the Petroleum Administration in regard to the use of the gasoline which we were using and the amount of lead in it. It is the same point that Mr. Davis mentioned. It was our understanding from the CAA that an agreement was made by which the CAA, as representing the public, would have the opportunity to check physically the amount of lead in the gasoline which was being used in October 1951, and that no action would be taken until that time. I have a copy here of that actual check.

As I recall, the check was completed on Thursday night, and the petroleum administration issued their order in the Federal Register the following Friday morning. There was no opportunity at any time before the issuing of the PAD Order No. 4 to consult or discuss the thing, except informally by telephone, and at no time had we been formally told that it would be issued. The following Monday or Tuesday, through the intervention of the Civil Aeronautics Board and the CAA cooperation of Mr. Chapman, we did have a full discussion

with all people in regard to the matter. We came to no further conclusion than we had previously. Complete disagreement, Namely, standing on one side with the airlines, the Civil Aeronautics Board, the CAA, and the engine manufacturers; and the Petroleum Administration insisting that we were overestimating the seriousness of the problem. We disagree with that opinion, and we think it is questionable that they have the experience that we have. We don't know the problems of refining gasoline.

We have here the actual checks of the operation of companies: Northeast Airlines, Capital, Delta, C. & S., National, Eastern, Midcontinent, Continental, Braniff, American, TWA, Colonial Western, Slick, California Central, Panagra, and Pan American. We have the minimum amount of lead content in the sample gasoline taken, we have the maximum amount, and we have the average amount. Our figures don't check with the figures of the PAD by actual check. The average in October was 3.25. The PAD thought that approximately 50 percent of the gasoline being used by the airlines was 4.0. According to our figures approximately 75 or 80 percent was in the vicinity of 3.0, and 30 to 25 percent was 4.0.

Furthermore, it is my understanding—and Pan American, which is represented here, which operates on the west coast, can confirm this—that the Standard Oil of California and the Texas Co., who are the main suppliers on the west coast, constantly refused to decrease the lead content of their fuel, and that they maintained a 4.0 lead content prior to the PAD and that the users of that particular fuel have attempted to get a reduction, but for reasons which are a little too complex, but the fact is if there are only two suppliers in an area you are forced to buy the gasoline from them or not operate. In my estimation that is a little different picture from the fact that we were voluntarily using 50 percent of 4.0 prior to the PAD order. There is a possibility that maybe both of us are right, gentlemen, but I have yet to see the facts that we have gotten refuted, as in those samples which CAA obtained from the airlines which I checked.

With regard to safety, in November we undertook to determine factually, as Mr. Davis has properly stated, to obtain more factual information, upon the statement that Mr. Chapman would reconsider the position of 4.0 cc for domestic and 4.6 for the international when the world situation eased. We undertook to give him more factual information as to the effect of the high lead upon our operation in comparison to the previous.

Mr. Davis spoke about the line of supply. From our observation it will take anywhere from a month to as much as 3 months for the present stocks which were brought before the PAD order went into effect to be replaced by the 4.0 complete as the minimum and 4.6 as the minimum in the international field.

If the PAD order were completely eliminated today and all of the suppliers of gasoline went back, let's say for round numbers, to 3.0, it is estimated it would take anywhere from 2 to 6 months before the stocks of 4.0 and 4.6 would be depleted. Pan American has just picked up an indication of actual checking starting in July of this year in one of their divisions, and the average went 3.2 and into October it started rising to 3.5. In November it jumped to 3.89, and in December it jumped to 3.91. In other words, we see the increase as it has developed.

In our opinion, gentlemen, we have not received the impact of lead upon the engines fully at this time. It is a cumulative problem. In order to anticipate that problem, we set up a complete program, the provisions of this 5- or 6-page document attempts to outline, in order that we could look at the maintenance difficulties and the overhaul problems, in an attempt, gentlemen, for the engine to tell us what is happening and we can anticipate that problem. We are constantly watching those problems at the present time.

For example, very quickly to tell you the essence of that program:

The results of the action of this committee, which was set up in November 1951, are outlined in ATA Engineering Memorandum No. 52-3, dated January 14, copy of which is attached. Essentially this program requires that the airlines compile and submit data relative to the following effects of increased lead:

(a) Increase in fuel consumption.
(b) Increase in spark plug failures.
(c) Increase in exhaust stack failures.
(d) Increase in cylinder failures, including valve guides, rings, pistons, and so forth.
(e) Increase in master rod bearing failures and all other bearings and bushing failures.
(f) Decreases found necessary in overhaul and inspection periods.
(g) Increase in sludge deposits, propeller domes, crankpin cavities, and reduction gear areas.

In addition to that, a number of carriers are cross-checking their fuel by taking actual samples with no identification, and putting them out to the refineries for actual content of fuel, both from lead and octane rating. Recently not only a small content but several barrels were shipped to the engine manufacturer for an independent analysis.

With the idea of lead and other complexities and problems I think photographs do as well as anything in regard to this matter. I have before me an actual engineering paper which was prepared which is entitled "Fuel Quality as a Restriction to Aircraft Utilization," by the project engineer of the Pratt & Whitney Aircraft Corp. It shows pictures of two spark plugs, one without a lead deposit and one with one. It shows the effect on valve guides in actual photographs. It actually shows conditions of valves with an accumulation of lead.

Gentlemen, the question of whether a particular model engine would be more sensitive, relatively, to 4.1 and another engine would be less sensitive to 4.6 is a very acute problem, but very definitely I think we can say that one of the most acute problems, considered so by most of those who are in agreement, is 4360, and the PAD did issue a waiver that that engine would be allowed to operate with 3.0.

Gentlemen, I know your time is short, and I have tried hurriedly to cover most of the highlights of the problem. We are concerned about the problem. As I have stated, it has been only within the last month or 2 months that the effect of PAD Order No. 4 has become evident. It will be approximately September 1952 before we will have complete factual information to judge all of the facts on the fuel consumption and the varying deleterious effect of increase lead on engine operation in order to have factual data to compare that with the previous condition.

With that, Mr. Chairman, I will ask if there are any questions.

Mr. WOLVERTON. Mr. Chairman, I assume that there will be a lot of questions that we would all like to ask but I do think it would be helpful if we could get as broad a view of this as is possible in the

brief time that is available to us at this time, so I suggest that before we adjourn we hear Admiral Horne and maybe someone from Pratt & Whitney so as to get a broad picture and so we may know how to lay out the future work of the committee.

Mr. BECKWORTH. We have a member of the Civil Aeronautics Board, Mr. Adams, who I believe has not been before the committee prior to this time. Mr. Adams, will you make a short statement that will give a résumé of the position of the CAB on this matter? Bear in mind that Mr. Horne is here and we would like him to make a brief statement before we get away from here, say, at 6 o'clock, if we can do the job that rapidly. What we have in mind is getting a cross section of those who are interested in this and to make it broad enough that we can get a look at this at a later day, which we hope will be very soon.

STATEMENT OF JOSEPH P. ADAMS, MEMBER, CIVIL AERONAUTICS BOARD, WASHINGTON, D. C.

Mr. ADAMS. Mr. Chairman and distinguished members of this committee, my name is Joseph P. Adams. I am a member of the Civil Aeronautics Board. In relation to this particular problem of added lead content in aviation gasoline, I was asked to take on as a collateral duty in October the matter or representing the CAB before the Department of the Interior or the PAD at the hearings that you have heard about. General Arnold has explained to you that this order was issued I believe on a Friday, which was I think October 19. I was unaware of the fact that the order had been issued, but at the request of the Chairman I did attend this meeting which was held, I believe, on October 23, the first meeting, in the Board room at the Department of the Interior. The meeting was very well attended by industry members, by Admiral Horne, by General Arnold, and I think all in all there were possibly 20 representatives of the industry there.

In regard to the effect of added lead on aviation gasoline I do not think there is any contradiction in the fact that it is deleterious and that it is not desirable to add lead to aviation gasoline in any amount. Where the addition of lead becomes critical might be more subject to controversy, but I think no one disagrees with that general premise.

However, at this hearing there was one matter that we could make no decision on, and that is that the gentlemen representing PAD explained, as they have done to you, about this shortage based on so many barrels per day. It was their contention that by adding to the lead content the refiners would be able to produce a certain percentage of additional gallonage of the higher lead content gasoline, thereby adding to the base stock.

However, the point on which we could not arrive at any decision was the contention of the industry, supported by myself, that when you use a higher lead content gasoline you increase your consumption of the gallonage to accomplish the same travel through the air. In other words, the estimates of witnesses there representing the engine manufacturers ranged from 5 to 12 percent in added consumption. When you take that added consumption in relation to the proposed added productivity of the refineries, it was our thought that it reduced it to a matter of possibly 2 to 5 percent.

In other words, the added consumption reduced it so that your net gain was relatively negligible. That was one point that was unresolved between, I will only say myself and the members of PAD.

However, the matter was not resolved that day, but we did ask permission at that time to seek further factual information and have another hearing, which was granted and we reconvened on Thursday, the 25th. I must say that possibly many of the points were repetitious, and we again covered the field and made our representations, all of which were requesting that, if at all possible, the order be rescinded. That was the end of the matter, except to this extent: The CAB did receive a letter dated October 29, from the Secretary of the Interior, and I will just read the last paragraph.

> You have my assurance that whenever in the future the supply situation in regard to aviation gas improves, the order affecting the quality of civilian aviation gas will be rescinded.

That was, in our opinion, a harmonious attitude as far as the immediate problem, and the CAB then took an action of its own. The Chairman gave instructions to the Director of our Bureau of Safety Investigation to monitor the situation in regard to evaluating the monthly flight reports and any reported difficulties from individual cases. To this date as far as I know there has been only one airline that has made a representation to the CAB in regard to the effect of the added lead on the gasoline that they are using.

Mr. HINSHAW. May I ask one question, Mr. Chairman.

Mr. BECKWORTH. Yes.

Mr. HINSHAW. I note from the record that Mr. Rentzel said he would prefer to have less gasoline with alkylate than to have more with tetraethyl lead. Was that proposal reiterated to the PAD, that you would rather have less alkylate gasoline supplied in the interest of safety than to have more gasoline with tetraethyl lead? That statement by Mr. Rentzel, I note, was in September 1950.

Mr. ADAMS. Yes, sir. That was prior to my appointment to the Board. Whether or not that question was put to us in 1951 I am not sure. I would have to ask General Arnold, probably. In any event I do not think that the CAB had the opportunity of assessing that, Mr. Chairman.

Mr. ARNOLD. Mr. Chairman. As I recall the PAD order was already issued when we sat down to discuss the problem. In all fairness, as I recall a telephone conversation with Mr. Davis about 10 days or 2 weeks before the meeting, and Mr. Davis in informal discussion brought up the question and said, "Well, would you people, the airlines, rather have less gasoline at 3.0 or more gasoline with 4.6 or 4.0?"

At that time the PAD order had not been issued.

My answer was, "We would rather have more gasoline at 3.0."

Of course that makes a difficult situation for Mr. Davis to solve.

Mr. ADAMS. Mr. Hinshaw, I did not answer you directly because, as I say, I do not believe that I or the members of the CAB were given that choice on the matter on this last discussion.

Mr. WOLVERTON. I think what was in the mind of Mr. Hinshaw and what certainly was in my mind was that you opposed it in 1950, and then according to the testimony of Mr. Davis, if I understood

it right, you took a different viewpoint in 1951. Did you take a different viewpoint in 1951 from what you did in 1950?

Mr. ADAMS. I am sorry to appear unable to give you a good answer to that, but the membership of the Board has changed considerably since 1950, but I am not aware that our position was any different, sir. I am only familiar, however——

Mr. WOLVERTON. If I understood Mr. Davis right, I was surprised to hear any indication that the position had changed. I didn't think it had.

Mr. ADAMS. I would not think so, sir.

Mr. HINSHAW. You were not given any alternative in the matter. The order was simply issued; is that correct?

Mr. ADAMS. Yes, sir. I was under the impression when I proceeded to this Tuesday meeting that we were going to go into the thing rather thoroughly and that whatever our decisions meant would be weighed in deciding to put the order out. I was surprised to learn when I got there that the order had already been issued.

Mr. BECKWORTH. Thank you very much, Mr. Adams. We will likely want to hear you further.

The Pratt & Whitney representative I understand is here. Will you come forward and give us a statement, please?

STATEMENT OF E. A. DROEGEMUELLER, PROJECT ENGINEER, PRATT & WHITNEY AIRCRAFT CORP., EAST HARTFORD, CONN.

Mr. DROEGEMUELLER. I am E. A. Drogemueller, of Pratt & Whitney Aircraft, project engineer.

I did not prepare a complete thesis on this subject. My knowledge is limited to the technical aspects only. One thing that personally concerns me is that we as an engine builder do absolutely everything we can from the technical aspect to make and supply a safe and more dependable engine.

Mr. BECKWORTH. Will you speak a little louder, please.

Mr. DROEGEMUELLER. We as an engine builder make every effort technically, to find a better valve material or better valve guide, and so forth, to make a more dependable or a more reliable engine, and fuel quality has a very large influence on engine dependability. If the fuel quality is decreased, we definitely see signs of deterioration of the engine. We have cataloged many of the effects of increased and decreased lead content. Our early concern with increasing lead content was with spark-plug fouling. We had anticipated it from bench testing. Our data are limited to bench testing; that is, dynamometer testing of full-scale engines rather than operating them in aircraft, and there is always the question of correlation between operating them on a test bed and in flight operation, although we are dependent on bench testing for our information. We anticipated about a 60-percent increase in lead fouling of spark plugs. This is a very complex subject and depends on the fuel/air ratios at which you operate engine in the aircraft, the rate of climb, and all the rest of it.

One thing that had us very much bothered was the possibility of increased propeller fatigue. Data shows that if you cut out one cylinder of an 18-cylinder engine you increase the propeller stress. This has been demonstrated by both Hamilton Propeller and Curtiss-

Wright. If the data were correct that you would get increased lead fouling of spark plugs, as much as 60 percent in going from 3 to 4.6, we anticipated safety might be jeopardized.

As the gentleman over here pointed out, we didn't want any crashes. We were depending on our test-stand data and tried to prewarn the operators of our enquipment that such might be the case.

There are a couple of other things that I would like to point out to this committee for their consideration. One is a tech order signed by Gen. Hoyt Vandenberg, dated the 17 of October 1950. Its title is "Preventing and Eliminating Spark Plug Lead Fouling of Reciprocating Aircraft Equipment." I will not bother to read the whole technical order, but it was apparently their concern at that time that the military were experiencing lead fouling of spark plugs, and the way they approached the problem was to richen the mixture or hold the primer button or other means such as changing engine power.

One concern of ours with the PAD order increasing the lead content was that we felt they would only manufacture paper gallons. In other words, if they increased the gallonage output of the refinery by increasing the lead content and putting in an inferior base stock, the operators of the equipment would have to richen the mixtures to compensate for the increase in lead content. We also have data that indicate that if the octane number or detonation quality of the fuel is held constant by the small knock test engine, which is the engine we use for buying and selling gasoline, the actual detonation quality in the big engine does not come out the same; the detonation as determined by the knock test engine is only correct insofar as you maintain about the same lead level and the same composition of the fuel. If the composition, including lead, is greatly changed, the full-scale engine doesn't understand this.

One of the conditions that would bother us considerably would be in a long-range aircraft. Under lean mixture operations, the engine would get rougher and they would hit the primer button, holding it on rich or make other attempts to get out of the evil effects of lead and increase the possibility of running out of gas.

I could go into numerous details of the mechanics of lead fouling such as the thermal conductivity and electric conductivity, but I don't believe this is what you want, sir.

Mr. BECKWORTH. Have you seen any evidence of propeller breakage, which you referred to, as a result of the use of this lead?

Mr. DROEGEMUELLER. You mean a specific case? No. I haven't. All we have are data to indicate if one cylinder is out the stresses will be increased.

Mr. BECKWORTH. That would mean, in view of some of the testimony this afternoon, that the full impact of the use of this kind of gasoline probably has not been felt and that we may be or could be in for some experiences like you fear.

Mr. DROEGEMUELLER. I believe that is correct, sir.

Mr. HINSHAW. The Pratt & Whitney Co. supplied engines to the military as well as to the civil transport industry. I don't imagine that the Pratt & Whitney Co. has gone to the trouble or would have the data on which to base an analysis of the number of engine failures or the number of parts failures as between those engines that are employed by the military on the 4.6 cubic centimeters tetraethyl lead content over the previous use of 3 cubic centimeters tetra-

ethyl lead content by the commercial airlines, even though you do furnish the spare parts.

Mr. DROEGEMUELLER. If I can answer that, sir, the problem is that we do not have a direct comparison. The military consider the engine to be an expendable item as compared to the important mission of B–36. They have a certain destination and a certain load and a certain range. The military believe it is worth while to abuse the engine in order to complete the mission even to the extent of decreasing engine life considerably. Do you follow my thinking?

Mr. HINSHAW. They do that anyway.

Mr. DROEGEMUELLER. I appreciate that, but they will even keep on increasing head temperatures to gain range, which is an abuse of the engine, because they consider it an expendable item at a given engine life.

The amount of military abuse the engine varies with the type of mission and the type of condition. So it is extremely hard to pin point a direct comparison between military and commercial operations.

One other point is the difference in time between overhaul of a commercial and military engine. Because of the necessity of taking high powers at high temperatures and at low fuel consumption, durability is adversely affected and military engines must be overhauled more often.

Mr. HINSHAW. How many hours between overhauls of a military engine of some particular type, 4350 or ——

Mr. DROEGEMUELLER. 4360?

Mr. HINSHAW. 4360, the one for which the commercial airlines are now being supplied with 3 cubic centimeters lead content gas wherever it is in the world. I understand that is used in the Boeing 377. I do not know about other commercial aircraft. Is it used in any other commercial aircraft besides the Boeing 377?

Mr. DROEGEMUELLER. That is the only commercial aircraft.

Mr. HINSHAW. What is used in the DC–6's?

Mr. DROEGEMUELLER. R–2800's.

Mr. HINSHAW. Are you in a tight position at the present time for furnishing spare parts for the R–2800?

Mr. DROEGEMUELLER. Yes; we are very tight on all engine models.

Mr. HINSHAW. In other words, if valves and valve guides and other things attached to this engine are going to fail more frequently by virtue of the use of high content tetraethyl-lead gasoline, you are going to have difficulty supplying spare parts, is that right?

Mr. DROEGEMUELLER. Extremely difficult.

Mr. HINSHAW. Is that engine used in military aircraft, as well?

Mr. DROEGEMUELLER. Yes, the R–2800 is used quite extensively by the Navy.

Mr. HINSHAW. And you are in a tight position with regard to it so far as spare parts are concerned?

Mr. DROEGEMUELLER. That is correct.

Mr. HINSHAW. What is the critical point for the fouling of spark plugs? Is that on the take-off?

Mr. DROEGEMUELLER. It is a combination of events, sir. I will digress to explain that, if you would like.

Mr. HINSHAW. I would like to have it.

Mr. DROEGEMUELLER. The condition is that you build up a deposit of, say, lead oxide, that is, PbO, when you cruise the airplane. Then during the landing and taxiing conditions the engine develops free carbon in the deposits in the cylinders. This is particularly true during idling. It soots up. You can see the smoke. The process is analogous to a blast furnace which is charged with pig lead and carbon. The carbon is used to reduce the lead to pure metallic lead. The carbon combines with the oxygen to make carbon dioxide or carbon monoxide. The reaction takes place at approximately 700° as read on a thermocouple. So the worst condition of lead fouling of spark plugs is on the take-off run. In other words, when you start your run down the runway, you have combustion chambers which have lead products in them. They also have free carbon in them. The combustion chambers haven't been hot enough to burn off the carbon. Perhaps you have ridden on the airlines where they run the engines up at the end of the runway. What they are trying to do, besides check the engine, is to decrease the carbon build-up so that it won't reduce the lead deposits to traces of pure metallic lead on the spark plugs during the take-off run.

After you are up and are airborne for a while and leveled off, sometimes the deposits reoxidize, changing the electrical conductivity of the deposits.

Mr. HINSHAW. How quickly does that happen?

Mr. DROEGEMUELLER. At elevated temperatures the reduction will take place instantly.

Mr. HINSHAW. Can that be the cause of engine failure on take-off?

Mr. DROEGEMUELLER. It could be the cause of misfiring of cylinders. You hear them popping or beating or may feel a rough engine shaking. It depends on how many go out. It is particularly a statistical problem.

Mr. HINSHAW. If half a dozen of them went out, then you would be in trouble?

Mr. DROEGEMUELLER. You would be in bad trouble.

Mr. HINSHAW. What is this I understand about this lead getting into the engine and having an affinity for main bearings? Can you tell us about that?

Mr. DROEGEMUELLER. Vaguely. The lead salts accumulate in the power section. There are various types of lead salts. They are not, of course, soluble in oil. It is just like putting a certain amount of gravel in the lubricating oil insofar as solubility is concerned. They are absolutely insoluble, and they centrifuge out in cakes within the crankshaft or within the knuckle pins or sludge cups on the reduction gear.

The worst condition, of course, is for those pellets or centrifuged lumps which have been held together by oxidized material in the oil, to shift and block an oil hole, either temporarily or permanently. That is one of our worst fears and conditions, and we try to design to minimize it, although it is never possible by design to completely eliminate those things.

Mr. HINSHAW. In other words, generally speaking, without going into too much detail at this time, I take it the free lead or lead oxide, or any combination of lead other than the tetraethyl itself, is a very dangerous thing in quantities in engines, is that correct?

Mr. DROEGEMUELLER. That is correct.

Mr. WOLVERTON. General Arnold, in one of his communications to the PAD, a copy of which has been sent to me by the Secretary of the Interior, made this comment. After several pages of detailed difficulties that arise, and so forth, he said this:

> Whether these quantitative effects will include the death of one person or of several hundred cannot be predicted, as experience in this matter is lacking. We do not know the detrimental effect of this change in gasoline content upon the life of engines and their reliability and the possibility of endangering human life through the action encompassed by PAD Order No. 4 is of great concern to all in aviation, the Civil Aeronautics Board, the Civil Aeronautics Administrator, as well as to the operators.

Would you agree with the opinion expressed in that paragraph by General Arnold?

Mr. DROEGEMUELLER. I certainly do.

Mr. HINSHAW. Mr. Chairman, in view of the fact that the time is short and we are getting along tonight, I wonder if it would be possible for the representative of Pratt & Whitney or one of his associates to present to us in written form a nontechnical discussion insofar as possible, because we are not technicians here, telling us in as simple language as possible just what may be expected from the addition of tetraethyl lead to gasoline employed in these engines? I personally am particularly impressed with the idea that engines in military aircraft are expendable. Of course, we know even the aircraft are expendable. In consequence of that, it may not be considered as serious a matter to the military as it is to the civil.

Also, it is not so important to the military because the question of the additional cost of operation itself through the use of additional quantities of gasoline or possible repair parts and new engines, and all that sort of thing, in the way of maintenance, is far more important to the civil than it is to the military. As you say, for military purposes they must necessarily abuse engines from time to time in order to get the most out of them for the purpose which the aircraft is designed to meet. We have no comment to make on that. That is not our business. At the same time, we are concerned with the wrecks that may result in civil air transport.

What does it cost to overhaul an R–2800, a major overhaul?

Mr. DROEGEMUELLER. Mr. J. G. Borger, can you give a better figure on that? Somewhere around $4,000?

Mr. J. G. BORGER (Pan American Airways). I think the Pan American Airways figure is about $5,000 or $5,500.

Mr. HINSHAW. To overhaul an R–2800?

Mr. O'HARA. As I understood your testimony, the great danger of high lead content gasoline to the plane, the greatest hazard, is after they come down and land and taxi up and stop, and then start up again, and the fouling that occurs while those engines are operating at slow speed while they are taxiing.

Mr. DROEGEMUELLER. No. I didn't make it quite clear.

Mr. O'HARA. I may have summarized it wrong. I do not want to misstate you.

Mr. DROEGEMUELLER. I picked out a typical example of one of the worst conditions. When starting down the runway for take-off, when the pilot pushes the throttles to take off down the field, it takes a certain amount of time to heat up the inside of the cylinder. You have a certain residual body to heat, a certain size piece of

metal. About halfway down the runway is when the temperature of the deposits gets high enough so that the electrical conductivity of the deposits is a factor, and then the carbon will start to grab off the oxygen molecule and go out as carbon dioxide. That is a very serious condition. While they are just taxiing around, the pressures and temperatures are quite low, and free carbon is being formed in the cylinders.

Mr. O'HARA. In other words, the danger of too much lead in the gasoline is at the very critical time of the take-off?

Mr. DROEGEMUELLER. And the amount of idling time, et cetera, contributes to the condition. That is not the only time spark plugs can foul. That is one of the worst times they can foul. Spark plugs can foul in flight due to very lean mixture operations and steady operation.

Mr. O'HARA. In his statement, General Arnold referred to the report of one of the gas manufacturers that while a slight increase of lead to 3 cc. or above 3 cc. is probably not harmful, it does then become very dangerous and very critical if it is increased a little bit beyond 3.2 or 3.3, or something like that.

Mr. DROEGEMUELLER. Our dynamometer data would indicate that the troubles go up as a log function. In other words, you could probably live with from 2 to 3 cc. of lead, but it gets pretty drastic when you go up another third. In other words, when you go from 3 to 4.5, a 50 percent increase, you might get double to five times the amount of trouble.

Mr. O'HARA. If you jumped it up to 4, what would you get?

Mr. DROEGEMUELLER. You would get probably a percentage something less than that. I believe it is something like penicillin. A little bit does all right but a big slug will probably do a lot of damage. That seems to be the indication we have.

Mr. O'HARA. That is all, Mr. Chairman.

Mr. BECKWORTH. Thank you very much.

Mr. DROEGEMUELLER. You are entirely welcome, sir.

Mr. BECKWORTH. Mr. Horne, in view of the fact that we have called on everyone else except you, we do want you, too. Will you make a brief statement, although the time is short? I know you all understand that we will wish your presence again soon, but we want to get this résumé spread on the record.

STATEMENT OF CHARLES F. HORNE, ADMINISTRATOR, CIVIL AERONAUTICS ADMINISTRATION—Resumed

Mr. HORNE. My name is Charles Horne. I am the Administrator of the Civil Aeronautics Administration.

The record indicates, as has been previously stated here today, that the CAA did protest and advise against any increase in the lead content in 1950. Again in October 1951, as has already been noted by Mr. Adams and General Arnold, the CAA advised against any increase in the lead content. As soon as we were informed that the order had been issued raising the lead content, we took action to set up procedures to maintain adequate degrees of safety.

As you have heard, the lead-content increase can have and does have deleterious effects. We believe it does, too. However, we feel that the

evidence as to the timing and degree of that effect, as has also been testified, is controversial.

In an effort to insure that no reductions in safety would be permitted, we advised our field agents and required increased inspections on the part of our field agents and required that the agents would work with the air carriers in order to keep a most careful check on when any effects began to show up and what those effects might be. To date the actual effects which have shown up have not been too great, largely because, as you have already heard, the amount of lead has not been raised over a sufficient period of time to take effect in some of the overhaul cases.

We have issued full information to everybody. We are watching and checking up daily on what is going on; and, was soon as there is any evidence that we can tie to, we will take appropriate action depending on what that evidence might be.

For example, we already do have evidence that there is a required decrease in the amount of time that spark plugs should run before they are changed. I have some figures here which we obtained from our regional administrations. One operator of Douglas DC–4 aircraft, for example, who under the previously available gasoline had been maintaining a spark-plug replacement at 400 hours, is now doing it at 200 hours. Another one, DC–3's, for example, that was replacing spark plugs at 475 hours, is now replacing them at 360 hours. And so on.

I give that as a case in point that it is a fact that this increased lead content is already resulting in increased fouling of plugs, but I also point out that the increased fouling of plugs is coped with, and we feel adequately for safety at the present time, by a very great increase in the amount of changing of the plugs and inspection of the plugs.

That is typical of our general action to cope with the increased lead content and not allow any decrease in safety of operations.

How long these maintenance measures can maintain the necessary levels of safety, only experience can indicate, and we feel that further evidence will be presented by the increased maintenance, by the increased inspections, by the special records which the carriers are keeping and the work that we have done, as General Arnold has already testified, to keep most careful watch on this thing and airline special efforts to break down the engines at earlier times in order to inspect the thing, to see just what effect this is having.

In those things we are working with the industry very closely to insure that whatever the effects, actual effects, not the controversial arguments of the experts as to what the effects might or might not be, but we are going to insure that the actual effects, whatever they may be, will be recognized and coped with as they occur.

Mr. WOLVERTON. Have you made any change in the number of hours of operation when there shall be an overhauling of the engine?

Mr. HORNE. Not as yet, sir, because we do not have evidence to indicate that that would be a requirement. As I indicated, we have recognized and have advised regarding the changing of spark plugs. Airlines have already decreased the hours between changes of spark plugs; but I thought your question referred to the requirement of so many hours of operation after which a complete engine overhaul would be required, and we have not as yet taken any action, because

there is not sufficient evidence to warrant it, to reduce the amount of total operating time before a complete overhaul is required. But we have reduced the operating time before certain partial overhauls and certain maintenance checks are required.

Mr. WOLVERTON. Do I understand that your action has been more in the nature of a warning than a directive to the airlines as to what they should do? I have in mind the release you issued—No. 355. It seems to me that it contained about as broad an enumeration of the dangers that could arise as anything that I have read on this subject.

Mr. HORNE. That is correct, sir. I have that release here, dated January 15.

Mr. WOLVERTON. If there is no objection, Mr. Chairman, I would like to have that made a part of the record.

Mr. BECKWORTH. Without objection, it will be made a part of the record.

Mr. HORNE. I will submit this release.

(The release referred to is as follows:)

DEPARTMENT OF COMMERCE

CIVIL AERONAUTICS ADMINISTRATION

Washington, D. C.

JANUARY 15, 1952.

AVIATION SAFETY RELEASE NO. 355

Subject: Use of Highly Leaded Aviation Gasoline.

The purpose of this release is to advise operators of the necessity for guarding against serious adverse effects on engine operation which may result from the use of aviation grade fuels with increased lead content.

Aviation gasoline with increased proportions of tetraethyl lead is currently being furnished for use in civil aircraft. During the past year a considerable portion of the high-grade gasoline for commercial use has been supplied to airline operators with 4.0 milliliters of lead per gallon.

The Petroleum Administration for Defense Order No. 4, effective October 30, 1951, now requires the following tetraethyl lead content:

> Commercial aviation gasoline for use by aircraft when operating within or departing from the United States shall contain at least 4.0 milliliters of lead per gallon for fuels of grades higher than 80. All of such fuels to be made available for use at foreign bases will contain at least 4.6 milliliters of tetraethyl lead per gallon. An exception is made in the case of grade 108/135 fuel which will continue to be available with the usual 3 milliliters of lead per gallon for those operators of Pratt and Whitney Wasp Major engines who require it. All grade 80 fuel will contain at least 0.50 milliliter per gallon of lead.

Accordingly, it is considered timely to point out typical engine difficulties which may result from increased lead content, and to suggest appropriate precautionary operation and maintenance practices which will tend to reduce or avoid such difficulties. This does not apply to the mildly leaded grade 80 fuel, which is expected to have little adverse effect in engines formerly using clear or unleaded grade 80 fuel.

Since all engines which use grades 91/96 and 100/130 fuel are involved, operators of many low- and medium-powered engines, as well as operators of the usual airline-type engines, should carefully consider the recommendations given in the following discussion of certain adverse conditions that may arise:

1. There will be increased deposits from combustion products.

This condition can cause detonation, preignition, valve sticking, burning, spark-plug fouling, and piston-ring sticking. The increase in deposits may occur chiefly in only certain cylinders because of tendencies toward unequal lead distribution or uneven fuel distribution.

Increased deposits may be reduced, or the adverse effects minimized by the following:

(*a*) Cruise with warm (60° to 75° F.) carburetor air and maintain cylinder head temperatures to the high side.

(*b*) Avoid extremely lean operation.

(*c*) Remove and clean or renew spark plugs more frequently.

(*d*) Periodically exercise exhaust valves while supplying penetrating oil or "upper lube" to the valve stem or supply such oil to the air inlet when the engine is idling. Such practice may offer some relief from sticking valves.

(*e*) Periodic cylinder top overhauling may be necessary between major overhauls in order to forestall chronic failures of the pistons and valve components.

(*f*) Periodic wheeze checking is suggested in most cases, since this can be performed easily and frequently (even daily) when pulling the propeller through slowly by hand and at the same time listening for leaking valves. Compression checking, while more involved, is recommended as a more thorough and more valuable inspection.

2. There may be increased deposits in oil passages and on the interior surfaces of the engine

This condition can cause lubrication stoppages with possible failure of critical bearings, etc. If such failures occur, they usually occur at high time since overhaul.

These adverse effects may be alleviated by the following:

(*a*) More frequent oil changes.

(*b*) Clearing critical oil passages periodically.

(*c*) Top overhauling or more frequent major overhauls.

3. There may be increased supercharger and induction system deposits

This is a possible side effect because, with greater lead content, more lead scavenging compound is provided to minimize lead deposition in the combustion chamber. In the past, deposition of lead scavenging compound from some fuels has occurred and is now recurring in the supercharger and diffuser passages. Serious adverse effects of this deposit can be avoided only by keeping a close check on maximum manifold pressures available in daily operations. When low manifold pressures are encountered which cannot be otherwise explained and corrected, the supercharger section should be suspected, and consequently removed and cleaned if necessary. Flushing without engine disassembly has been successful in some instances.

4. There may be occasions when fuel with greatly increased specific lead content is encountered

This can result from long-time storage under hot conditions, which causes loss of some of the more volatile fuel constituents. Use of such fuel is not recommended.

Additional copies of the release may be obtained by addressing a request to Civil Aeronautics Administration, Aviation Information Office, Attention: Inquiry Branch, W–58, Washington 25, D. C.

EDWARD C. MARSH,
E. S. HENSLEY,
Director, Office of Aviation Safety.

Mr. HINSHAW. Mr. Chairman, there are always a certain number of engine failures in aircraft. Do you keep any statistics to indicate that the number of engine failures of any given type, per hundred hours or per thousand hours, has been on the increase within recent months?

Mr. HORNE. We keep very complete statistics on that, sir. I have with me a sheet which indicates for different types of aircraft for the fourth quarter of 1950, the third quarter of 1951, and the fourth quarter of 1951, what the engine changes have been. This is a factor which we use. It has a rather complicated basis as to how we arrive at it. It is in effect the total number of premature engine removals for a specified period, divided by the total utilization or engine hours, divided by a thousand for the same period. Then I can give examples of how the figure is calculated and what it means. I have that kind

of figure, which we feel gives a pretty accurate indication, for each individual type of aircraft as to what the engine changes have been; and if there were a significant increase in any of these—and we have watched them very carefully—then we would be in a position to act and to reduce the engine-overhaul time required before a complete engine overhaul would be taken. I have those facts and records here.

Mr. HINSHAW. I think they would be very helpful and we would be happy to see them.

Of course, it must be recognized that the effect is cumulative. If you take the records of the last quarter of 1951, the quarter within which this order was issued, it probably would not show very much in the way of difference, because the quantities of the new type of gasoline that were made available, as has been testified earlier, did not begin to be provided for a month or so after the order was issued, particularly when, as I presume, it was mixed with other gasoline already in the tank. Consequently, the percentage of tetraethyl lead rose rather slowly before the statistics given by General Arnold. Presumably by this time practically all the tanks have been emptied of the less than 4 cubic centimeters tetraethyl lead content gasoline and I would assume that by this time all tanks would show a full 4-cubic-centimeter rating. It seems to me that it would be about at this time when we might begin to feel the full effects, from this time and for the remainder of this quarter and into the next quarter.

Keeping statistics by the quarter is going to make things a bit complicated if you wait until the end of the quarter to tab them up.

Mr. HORNE. I agree with you, sir, and therefore we also have the records by the month, and we have been keeping those. In fact, we are keeping a much more frequent check to try to estimate when there is any trend as a result of this cumulative effect.

We, too, agree with your statement that the cumulative effect is perhaps to show up shortly; and if it should show up we will, I think, be on top of it before it becomes significant, because we are requiring the additional overhauls, inspections, and so forth. Our people and the airline people are watching this thing very, very closely.

Mr. HINSHAW. There is one more point that I would like to make. In cases of engine failures that occur from time to time, is it true that those engines are immediately broken down for complete overhaul, or do they merely see what happened to what and repair that?

Mr. HORNE. No, sir. As you say, an engine which fails is given an overhaul as soon as practicable in order to determine what made it fail, and those records are communicated to us very quickly so that we have, I believe, up-to-date information as to what causes engine failures within a very short time after the engine has failed and has been broken down.

Mr. HINSHAW. If engine failures were to be reported to you as a result, estimated by the user of same, of the use of high-content tetraethyl lead in the gasoline, how fast could you find that out?

Mr. HORNE. I think I would find it out within a matter of hours, sir.

Mr. HINSHAW. After the engine had been broken down?

Mr. HORNE. That is correct, sir.

Mr. HINSHAW. Has any such report been made to you yet?

Mr. HORNE. No, sir.

I think you have made the point that such reports, if they do come, would be as a result of cumulative effects and would be experienced possibly not for another month or two or possibly longer. I already gave you the effects of the fouling of the spark plugs which we have already recognized and which we have already coped with by a much more frequent change of plugs to insure the lack of that type of difficulty.

Mr. HINSHAW. For example, this matter has been mentioned by the representative of Pratt & Whitney a moment ago—the plugging up of ceratin oil ducts. Would there be any way for the ordinary mechanic in taking down an engine to determine whether or not it was caused by lead salts or whatever lead compounds there were?

Mr. HORNE. I would like to ask one of my staff that question, sir. I am afraid I am not enough of an engineer to be able to answer that question satisfactorily for you.

Could you answer that?

Mr. STEPHEN H. ROLLE (Chief, Power Plant Engineering Branch, CAA). I think the answer to that is that the mechanic doesn't merely tear the engine down himself. The airline management sees to it that some technician is there to see the disassembly of the engine, and the CAA agent assigned to that particular operation will also see to in that someone qualified is there on the spot to determine what the difficulty really is.

Mr. HINSHAW. I hope that these things can be found promptly. It is a curious thing that we have had a number of engine failures on take-off which have come to our notice recently. That may be as a result of keener reporting by the press than heretofore, but certainly we had one situation in Elizabeth, N. J., where an entire cylinder was missing, and another situation in which we know that an engine stopped in flight and the propeller reversed on another, and another situation which we are not very sure of, I understand, but it was in connection with something that probably had to do with the engine. It is, I assume, quite difficult to find out, after an engine has been subjected to very high temperatures probably far in excess of 700 degrees, due to the burning of hundreds of gallons of gasoline, to make any determination of what may have caused that engine to fail or whether it might have been caused primarily from lead.

I think that in the engines that do fail where no accident occurs, you would have a much better chance of finding out what made the engine fail than otherwise, and hence be put on notice.

Mr. HORNE. I agree with that, sir, and that is exactly our point. We feel we learn a tremendous amount from the most careful inspection and check of mechanical failures of various kinds which occur without an accident. From those we learn, and from those we build up the information on which we take the positive action required in order to avoid such failures. So you are correct, and we are following that particular aspect as closely as we possibly can so that we will have information, not from accidents, but from minor things which do not result in accidents, which are successfully coped with, so we can get from them the information, and from them we get good information.

Mr. HINSHAW. Do the two Military Establishments employing transport-type aircraft, to your knowledge, make a close and careful inspection in the case of engine failure, as do the civil air carriers?

Mr. HORNE. I am afraid I can't answer that question from my personal knowledge, sir. I would have to refer that to the appropriate experts to estimate.

Mr. HINSHAW. Have any reports been made, that you know of, by MATS or by the Navy with respect to engine failures and their causes in those services?

Mr. HORNE. Yes, sir. I say again, I myself have no personal knowledge of individual reports of that kind, but it is my distinct understanding that MATS, for example, keeps a very close check on its engines and on the causes of failure of its engines.

Mr. HINSHAW. Do you know what the relative time between overhauls is as between an engine used by MATS and that same engine used by a commercial carrier?

Mr. HORNE. Not offhand, sir. I could supply that information. I wouldn't like to quote it from my memory.

Mr. HINSHAW. If MATS has been using 4.6 tetraethyl lead gasoline for some time, it should have had plenty of experience, at least, and be able to give us some very good estimates as to what actually occurs with 4.6 tetraethyl lead gasoline. I hope that they will be willing to make their experience available to the Civil Aeronautics Administration in order to provide some sort of guide for their purposes in connection with the commercial carriers.

Mr. HORNE. Yes, sir.

Mr. HINSHAW. I suggest it might be a good idea to ask MATS, and also the Navy.

Mr. HORNE. That is a good point, sir.

Mr. ADAMS. Mr. Chairman, one point that the committee has turned to since I made my statement is the timing of these possible difficulties, when they might be expected in relation to, you might say, the use of the present stocks. I think I have a matter here that I should put in the record. I mentioned in my statement that to date, while the CAB has been monitoring this, we have had only one message or report from an airline concerning their difficulties, but I do have a telegram here. The telegram itself is quite general, but I think I should read it into the record in relation to this problem. It is dated February 18, addressed to Hon. Donald W. Nyrop, Chairman, Civil Aeronautics Board, Washington, D. C.

> We are confronted with a serious problem as a result of the Petroleum Administration for Defense Order No. 4 increasing the tetraethyl lead content in aviation gasoline. CAA Aviation Safety Release No. 355 spotlights difficulties created. Can you advise what action we can take, either alone or jointly with the industry, to obtain early release?
>
> G. T. BAKER, *National Air Lines, Inc.*

The CAB in response to that did send a telegram to our agent in Miami, and he is making a study of it, but as you can see, the general nature of the telegram is not particularly helpful. He referred to difficulties in general.

Mr. BECKWORTH. What date was that telegram?

Mr. ADAMS. February 18.

Mr. WOLVERTON. What was the date of their accident at Elizabeth?

Mr. HINSHAW. February 11, I believe.

Mr. ADAMS. But the CAB has nothing to report to you gentlemen as a result of our investigations that are going on in regard to this. I only made mention in my statement that we had received only one

report from an airline. In view of the turn that the testimony has taken in regard to the timing of this, I thought it was more appropriate to read that into the record.

Mr. BECKWORTH. Their accident, as I recall, was one in which one of the propellers feathered and one reversed, was it not? That certainly seems interesting, in view of what is on page 2 of this Aviation Safety Release No. 255, which says:

> There may be increased deposits in oil passages and on the interior surfaces of the engine.
>
> This condition can cause lubrication stoppages with possible failure of critical bearings, etc. If such failures occur, they usually occur at high time since overhaul.

I remember soon after that accident, we had here one of the experts on the propeller of the Pratt & Whitney Co.—or the Hamilton Standard, I believe was the name of the propeller—and that adds up to rather interesting information in view of all the facts we have been able to get here this afternoon.

Mr. HINSHAW. I believe, Mr. Chairman, it was reported that that engine was due for overhaul in 86 hours. I assume that its overhaul period was about 1,500 hours. Was your report released at that time on the R-2800?

Anyhow, it was within 86 hours of its overhaul time, which is getting pretty close to the time when some failure might be expected, if failures are due to occur at some percentage of that time below the normal overhaul time.

Mr. HORNE. I might say, sir, that we were informed by the Civil Aeronautics Board regarding the telegram that was read, and we have started our investigation of that particular question to find out what was behind the telegram and what facts we can develop from that.

Mr. HINSHAW. May I point out one thing: If an engine came off overhaul in October and was installed in an airplane, and its average utilization was 10 hours a day, 1,500 hours of flying time would be consumed in 150 days, would it not?

Mr. HORNE. I have some figures on the average hours per day, and they run about an average of 7 hours per day.

Mr. HINSHAW. They do run as high as 10 and 11, I believe.

Mr. HORNE. Not in the figures I have before me, sir.

Mr. HINSHAW. On plane utilization?

Mr. HORNE. Yes, sir. The highest figure I have of any before me—and I have all the standard airplanes before me—averages about 8.4.

Mr. HINSHAW. 8.4 would be about 200 days, approximately.

Mr. HORNE. Yes, sir. The average is about 7. As I say, the highest average is about 8.4.

Mr. HINSHAW. Obviously this engine, which was within 86 hours of overhaul, was getting along toward the final period, and it had been consuming high tetraethyl lead content gasoline for several months.

Mr. HORNE. That is a very difficult question, sir, as to how long there had been any increase in tetraethyl lead in the gas. As you pointed out a few moments ago, the actual increase in tetraethyl lead at any one point or in any group of tanks was gradual from the time that the order was issued until roughly about the present time, so it would be very difficult to prove or even to estimate how long that

particular engine had been subjected to any increase of tetraethyl lead in its fuel.

Mr. HINSHAW. I was remembering statistics given by Mr. Arnold when he told us the quantities were gradually going up and that they had exceeded the 3.3 point for some months now.

Mr. HORNE. That is correct.

Mr. HINSHAW. Three months. That is nearly 100 days.

Mr. HORNE. That is correct, sir.

I would like to point out that at the time of the meeting which Mr. Adams and General Arnold mentioned, at which I was present, with Mr. Chapman, as I recall both Mr. Adams and myself strongly recommended at the time that this lead content be reduced as soon as possible, as soon as the national emergency would permit it; is that correct?

Mr. ADAMS. That is correct. And with reference to this telegram that I read, the fact that it was addressed to the Chairman of the CAB does not mean that we are acting on our own. We are acting in harmony with the CAA, and we have been through this entire problem. We are exerting our fullest effort to make it as safe as it can be made.

Mr. BECKWORTH. Thank you very much, gentlemen.

Mr. WOLVERTON. In connection with the letter that I addressed to Secretary of the Interior Chapman, and his reply, if there is no objection on the part of the committee, I think it would be appropriate to make the reply of the Secretary a part of the record at that point where I read the letter.

Mr. BECKWORTH. Without objection, that may be done.

(The reply referred to above appears in the appendix.)

Mr. BECKWORTH. The committee is adjourned subject to call of the Chair.

(Whereupon, at 6:40 p. m., the committee adjourned, subject to the call of the Chair.)

AVIATION SAFETY

MONDAY, MARCH 10, 1952

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE OF THE COMMITTEE ON
INTERSTATE AND FOREIGN COMMERCE,
New York, N. Y.

The subcommittee met at 10 a. m. in the lower court room, 70 Columbus Avenue, New York, N. Y., Hon. Lindley Beckworth (chairman of the subcommittee) presiding.

Mr. BECKWORTH. The meeting will come to order.

First, I would like to say that this subcommittee requested Secretary of the Interior Oscar Chapman, in the interests of aviation safety, to consider the immediate cancellation of Petroleum Administration for Defense order No. 4.

This order, issued last October 19, over the unanimous objections of the aviation industry, increased the amount of tetraethyl lead used in commercial aviation gasoline.

In the course of the hearings and investigation we have been conducting into the recent air crashes in the New York area, we have been looking into the type of gasoline now in use. Airline operators, aircraft and engine manufacturers and governmental aviation authorities all have indicated to us their vigorous opposition to PAD order No. 4 on the ground of increased hazards to aviation safety.

This order No. 4 raised the quantity of tetraethyl lead in commercial aviation gasoline from 3 points to 4.0 and 4.6 cubic centimeters of ethyl per gallon. It was done for the purpose of maintaining the desired high octane rating while the amount of alkylates hitherto used to obtain such ratings were diverted to the synthetic rubber industry and to other domestic and foreign gasoline programs. The rubber industry is now in good shape, according to reports.

Based on the hearings the committee has held on this subject and on facts which otherwise have come to the attention of the committee members, we are of the opinion that PAD order No. 4 should be canceled. When this subject first arose in the fall of 1950, the Civil Aeronautics Board took the position that in the interests of safety it would prefer rationing of aviation gasoline of the type in use, if such were necessary, rather than to accept the proposed change in gasoline specifications.

The order was not issued for a year, and last October it apparently was put out with very little, if any, consultation with the commercial aviation industry, and no opportunity for a choice by them between quality and quantity.

The committee is not aware of any reason at this date why adequate supplies of aviation gasoline manufactured to the former specifications

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cannot be made available to commercial airlines. We are of the opinion that the hazard inherent in the higher lead content gasoline should command the most earnest consideration of those who are in charge of the Petroleum Administration for Defense.

Now, you are probably aware that this committee was set up several weeks ago for the purpose of looking into the airplane accidents which had occurred prior to the formation of the committee and which were very serious. Since that time when the subcommittee was originally set up, at least one additional very bad accident has occurred in this area at Elizabeth, and, naturally, in that connection the committee has undertaken to study the problems relating to safety. Our committee is interested in over-all aviation safety of the people who fly in airplanes and also, of course, as it relates to those on the ground. This committee is interested in and seriously concerned with the problems of those who are subject to the hazards by virtue of airplane accidents that might occur anywhere.

We have been talked to and corresponded with by many people from the general LaGuardia-Idlewild area. Some of those who have indicated the greatest concern for the people in the areas affected have been Members of Congress who represent this general vicinity.

It so happens that two of the members of the Committee on Interstate and Foreign Commerce are from this general area. One of them is the ranking Democratic member, Mr. Klein, who is also a member of this subcommittee, and the other is Congressman Leonard W. Hall. From time to time they have told us what they regard as the serious problem that relates to the general New York area.

Then we have had other Members of Congress from the general area who personally have talked to the committee members and who have sent us correspondence and communications they have received, and we, as a subcommittee, have received many communications from citizens and civic organizations interested in this over-all problem.

I want to repeat that this committee is interested not only in the question of safety as it may affect one community but the over-all safety of communities which are affected by modern aviation.

It is my privilege at this time to present, for any statement he might care to make, Representative Leonard W. Hall, who, because of his duties with the SEC subcommittee now in session in the courthouse at Foley Square, will have to leave shortly. However, I feel sure that he will have time to make a brief statement before he leaves.

STATEMENT OF HON. LEONARD W. HALL, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF NEW YORK

Mr. HALL. Mr. Beckworth and members of the committee, first, on behalf of myself and on behalf of those residents and officials of Nassau County who are here, I desire to express my thanks and appreciation to you for setting aside special time here in New York to hear not only people from my own district in Nassau but others in the general New York area in relation to our safety problems in this general area.

It so happens that I am personally obligated this morning, as you have pointed out, Mr. Chairman, to be in two places at the same time and, strangely also, in matters concerned with work of the same committee—Interstate and Foreign Commerce. I am supposed now also to be with the SEC subcommittee in the courthouse at Foley Square,

and I should like at this moment to ask the indulgence of your committee and especially my people from Nassau, to appreciate my situation, and I should like to ask leave of you and of them that I be permitted to go to my other duties down at Foley Square as soon as I may.

You, Mr. Beckworth, and all the members of the committee are, of course, on notice of the concern and worries and fears that have been generated in the area of Nassau County more or less adjacent to Idlewild. I have told you in Washington of the representations that have been made to me, that our people in the Cedarhurst-Woodmere-Lawrence area, and environs, find it really a tough thing these days to live in peace.

The conditions caused by Idlewild, to quote the direct words of some of these people, have been terrifying—caused by low-flying planes. Even without the horrible catastrophies at Elizabeth and the deadening fear held by many of these people in the area, the area that I have mentioned, of something like that happening to them, without any tragic background of this kind, the normal results of the traffic at Idlewild have caused a great deal of protest and resentment. During normal operating conditions it has been emphasized most earnestly to me that the people in the areas I have mentioned are awakened from their sleep and, generally, that community life has been harassed to a point where it is becoming unendurable. But beyond these protests is, of course, the increasing fear of real tragedy happening comparable to that in Elizabeth and in other places.

I will not take time to give you all the facts that should be presented to your committee, because these representatives I have mentioned will do so. As I have already stated, I am now due down at Foley Square at the meeting of the SEC subcommittee and if you hear the representatives of Nassau County at this time, I shall appreciate it greatly. I am sure that they will not take much more than half an hour of your time altogether. A group from these people are with me this morning and present also are representatives of the county of Nassau and the township of Hempstead. Naturally, we are all tremendously interested and concerned. The groups will speak to you. I appreciate the pressures on the committee, and I know that these groups will talk to the point, be brief, and that their message will be earnest and also factual. I commend your committee's most earnest consideration of what they have to say, and I thank you for the privilege of permitting me to make this brief statement.

Mr. BECKWORTH. Two of our colleagues, Representative Delaney and Representative Clemente are here, and I recall at one time they came with the subcommittee to LaGuardia Field and assisted the committee to obtain facts in reference to the situation down at LaGuardia Field. I believe each of them would like to make a brief statement.

Congressman Delaney, do you care to say anything?

STATEMENT OF HON. JAMES J. DELANEY, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF NEW YORK

Mr. DELANEY. Thank you, sir.

I represent the territory adjacent to LaGuardia Airport. I reside only a few miles from there—I would say about 3 miles from the airport.

Having resided there since the beginning of the airport, I could watch the progress of the airport and I was in a position on occasion to know what was happening when runway No. 4 was used. I live in a two-family house and I live more than 3 miles, not more than 3 miles, from the edge of the airfield and the airplanes pass over the house with such terrific force that it shakes the pictures on the wall. I don't know how much danger there is, but it is a cause of inconvenience and even terror to many of the people. I have been in close contact with Father Lanahan, who has a school adjacent to the airport, and he has told me that it is impossible to preach a sermon on Sunday morning and almost impossible for the teachers to teach the children in Sunday school.

I realize, of course, that every plane that takes off must do some low flying until they can gain the proper height. My suggestion is that if they follow the water line as much as possible or take the course along the wasteland adjoining Rikers Island, that would help the situation some, and of course the construction of longer runways would be a possible solution. This wasteland along Rikers Island is not used and is built-in land. As a matter of fact, LaGuardia Airport is all filled-in land and I can remember as a boy swimming in the water that was filled in to make LaGuardia Airport. This land I am talking about, this wasteland, is used as a garbage dump and was used as a garbage dump for many years. That might help protect the public by going over Rikers Island or the land adjacent to it. Rikers Island is used to house one of our penal institutions. It is supposed to be farming land but I don't see much use for it.

Also, as I suggested, take-offs and landings could be made with the approaches on the water and off the water and I am sure that would be a great help and protect the public. The fact that we have had no accidents or major catastrophe occurring as yet does not mean we should not take every precaution to prevent such a catastrophe from occurring. I suppose time will catch up with us unless we do something about it beforehand. Every mechanical and scientific device known should be used at that airport because of the congested condition of the territory adjacent to it. It would be a terrific catastrophe if something happened to one of these large airplanes. We have apartment houses in the path of these airplanes, having 60, 70 and a hundred apartments in them.

I realize that the placement of the airport is a local matter. I realize further that the authority of this committee and the Federal Government is limited, and therefore I urge that every mechanical and scientific device be used, particularly at LaGuardia Airport.

I thank the committee for permitting me to speak.

Mr. BECKWORTH. Thank you very much, Mr. Delaney.

Representative Clemente, do you wish to say anything?

STATEMENT OF HON. L. GARY CLEMENTE, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF NEW YORK

Mr. CLEMENTE. I live within two blocks of Idlewild Airport. I bought my home there since then and I have heard my dishes rattle and the walls of my house have cracked as a result of the reverberations of the planes flying overhead. I may say that I live there and I knew that the airport was going to be there, so I have no com-

punctions about that. However, I believe that a little money spent in resetting the runways so that the planes can recircle the field to land in the manner that would avoid flying over the habitations in the congested area and also changing the patterns by agreement between the parties, would help considerably in eliminating some of these conditions. A pattern had been worked out 3 years ago by agreement but they wiped out the pattern.

If these various things were done to ameliorate present conditions, at least the public would understand that everything was being done for their safety and their protection. Also, if there is any way of putting a gigantic parachute on these planes so that in the event of a failure they could drop gently to the ground, it would be a tremendous safety factor if that could be worked out.

Also, I believe they should wipe out the reversal props, and in trying to make any of these changes it would show the people that the airlines and the CAA and CAB are trying to assist in wiping out these hazards in an attempt to reduce them to a minimum, and it would be appreciated by the public.

I am not an expert in the field of aviation, but I know that when a gigantic plane takes off, with thousands of gallons of gasoline aboard, in the event of an engine failure or a crash, I assure you it will wreak devastation of a terrifying nature.

I know that this committee is doing a good job, and the people of Queens County appreciate very, very much every effort made by this committee to assure them safety from aviation hazards.

I thank you.

Mr. BECKWORTH. Several weeks ago I recall that Mr. Robert Tripp Ross indicated in a wire to me his interest in the seriousness of this situation.

Since that time he has been renominated and elected to Congress. Would you care to make a statement, Mr. Ross? I do know that his interest has been very consistent, and I feel that he may have something of importance to tell this committee.

STATEMENT OF HON. ROBERT TRIPP ROSS, A REPRESENTATIVE IN CONGRESS FROM HE STATE OF NEW YORK

Mr. ROSS. Mr. Chairman and members of the committee, the district I represent at the moment surrounds LaGuardia Field. I first want to express my thanks and the thanks of the constituency of that district for the Aviation Subcommittee coming down here to give the people from that area an opportunity to present the facts confronting them as a result of aviation hazards at LaGuardia Airport and regarding the seriousness of this matter.

There is no question but that the problem at LaGuardia Field is a serious problem. I have lived with it, and the people whom I represent have lived with it, and the people of Jackson Heights have lived with it for many years. I know you are aware of the fact that representatives of civic organizations throughout this territory have been endeavoring for a number of years to have this low-flying condition corrected.

There is a great deal of sentiment among the people in this district to endeavor to have LaGuardia Airport closed and we all know

that presents to this committee and the entire aviation industry a serious problem. On the other hand, there are probably a good many people who feel that the airport should remain. I feel this can be worked out by providing adequate runways and providing greater safety measures and arranging well-planned flight patterns.

There are many representatives of civic organizations here ready to speak on the subject today and I know you will listen to them and do what you can to correct the situation and assure them that the hazards they are facing will be studied and, if humanly possible, removed.

Thank you.

Mr. BECKWORTH. No member of this committee has been more interested in exerting effort to call attention to the real facts in this area than one of the members of this committee sitting here today. Because of his unusual interest in the problem, I recognize my own colleage, Hon. Arthur G. Klein of New York, for any statement that he wishes to make.

STATEMENT OF HON. ARTHUR G. KLEIN, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF NEW YORK

Congressman KLEIN. As the New York City member on this committee, I want to remind you all that Queens County is part of the city of New York. These gentlemen have presented the problem as well as I possibly could myself. However, I believe the people in this vicinity, as in the vicinity of Newark do, appreciate what the Port of New York Authority has done and the fact that it has been very, very cooperative in this entire situation.

I think, as suggested by one of the members who spoke before, that before any changes are made, that representatives of the Port Authority should consult with representatives of the people in the area of that particular airport. However, I want to assure the people of New York that every effort will be made to insure that conditions are corrected so as to eliminate the serious problems that now confront the people in the areas adjacent to the airport, and also to insure that we will not have any accidents in the nature of the ones in Elizabeth, in the future.

However, I may say that the problems of New York City are no different from the problems that confront airports in any other locality. When we are finished with our hearings, I am sure we will make up a report that will enable us to make the proper recommendations and bring all the facts out to the public. I know that I can speak for the port authority because they are as anxious as we are that no accidents occur under their facilities or under the airports in their jurisdiction.

I might also state that representatives of the Port of New York Authority are here today in the event that anyone here may wish to ask questions after the various witnesses have testified.

Mr. BECKWORTH. The first witness, I understand, will be Mr. James G. Moore, special attorney for the incorporated village of Cedarhurst.

STATEMENT OF JAMES G. MOORE, SPECIAL ATTORNEY, VILLAGE OF CEDARHURST

Mr. MOORE. Mr. Chairman and members of the committee, I prepared a statement and I hope it meets with your approval after I have given you that statement. If I may, I would like to read it at this time.

Mr. BECKWORTH. You may read it if you wish or it can be incorporated in the record. You can emphasize the parts that should be emphasized and let the rest go in the record.

Mr. MOORE. May I say that I am not sure how long the meeting will last today and I am certain that the members of the committee want to hear everybody who wishes to be heard and for that reason I will try to make my statement as brief as possible.

Let me say that Cedarhurst is an incorporated village of some 6,000 inhabitants, lying 1½ to 2 miles southeasterly from the southeast boundary of Idlewild Airport. It was in existence long before Idlewild was built or even contemplated.

The residents of Cedarhurst chose that for their home because it was a quiet and safe place to live and to bring up their children. The advent of the airport so close to its northwestern boundary has changed all of that.

I should like at the outset to describe the "navigable airspace" as prescribed by law, as laid down by Congress in 1938.

Title 49, United States Code Annotated, section 403, provided:

Section 403. Public Right of Transit

There is recognized and declared to exist in behalf of any citizen of the United States a public right of freedom of transit in air commerce through the navigable airspace of the United States.

"Navigable airspace" is defined by title 49, section 401, as follows:

Section 401. Definition

(24) Navigable airspace means airspace above the minimum altitudes of flight prescribed by regulations issued under this chapter.

The "regulations issued under this chapter" provide that, over congested areas like Cedarhurst, the minimum safe altitude is such altitude as will enable an aircraft, on the failure of power, to make a safe landing outside the area, but not less than 1,000 feet above the highest structure in such area.

Therefore, the "navigable airspace" through which the public has freedom of transit under section 403 is the airspace over 1,000 feet above the highest structure in the village of Cedarhurst. The airspace under 1,000 feet is hereinafter referred to as the "superadjacent airspace."

No like freedom of transit has ever been given to the public through such superadjacent airspace. Neither Congress nor any State government has sought to declare property rights therein, nor to regulate air transit through it.

Therefore, the tributaries of the navigable airspaces through which ascending and descending aircraft navigate to reach and leave their ports of call have never been prescribed and have never been regulated.

No one, not even the residents of Cedarhurst, wish to stand in the way of the development of air commerce. They realize that as rivers,

canals, and ship canals enable oceangoing commerce to reach the high seas from the wharves and docks, air tributaries capable of channeling air commerce to the open skies are necessary.

We simply claim these tributaries have never been prescribed by law and now we claim that should be done now and the establishment of these tributaries should be made with regard to the property rights of the subjacent areas.

The residents of Cedarhurst claim only that these tributaries have to be established by law. Where, as in the case of Cedarhurst, the congested area was erected long before Idlewild Airport was built, the establishment of these tributaries should be made with full recognition of the property rights of the subjacent landowner in the superadjacent air.

If these tributaries require an easement through the superadjacent air, that easement should be acquired with due regard for the fifth amendment to the United States Constitution. If the easement thus found necessary is low enough to affect the habitability of the subjacent land, the fifth amendment requires the appropriation and payment for the land as well.

In the Causbey case, the Government conceded, and the Supreme Court held, that such was the law.

The regulation of the Administrator of Civil Aeronautics prescribing the minimum safe altitude of flight is prefaced by the words "except when necessary for take-off and landing." These same words also appear in the law of the State of New York (General Business Law 245, subdivision 5).

These words "except when necessary for take-off and landing" are the eight most abused words on the statute books of the United States. They have been loosely taken to mean that whereas Congress restricted the freedom of transit in air commerce to the navigable airspaces, it did not likewise restrict the use of the superadjacent airspace "when necessary for take-off and landing" and that since it did not do so, the superadjacent air was free to be appropriated at will by the Administrator of Civil Aeronautics and by the air carriers and the like. Whether the use of the word "necessary" in the phrase above-quoted connotes emergency or not, is not argued. It is argued simply that these eight words, if they mean that the aviator has a license to use the superadjacent airspace at will, are unreasonable and unconstitutional, in violation of the fifth amendment to the Constitution.

In passing the 1938 Civil Aeronautics Act, Congress appears to have struggled with the regulation of the superadjacent airspace, for the rules for the use thereof were eliminated from the bill as "unnecessary specification" and "surplusage" for the conference report states (conference report, H. Rept. 1162, 69th Cong., 1st sess.):

> The substitute provides that the Secretary of Commerce shall by regulation establish air traffic rules for the navigation, protection, and identification of all aircraft, including rules as to safe altitudes of flight and rules for the prevention of collisions between vessels and aircraft.
>
> The provision as to rules for taking off and alighting, for instance, was eliminated as an unnecessary specification for the reason that such rules are but one class of air traffic rules for the navigation and protection of aircraft.

As applied by the Administrator of Civil Aeronautics, the power thus delegated has been exercised without any regard for property

rights and the safety of the man on the ground. His regulations are subject to attack as unreasonable and the delegation of the power to make them as an unconstitutional delegation of legislative power.

For instance, he has prescribed "turning and maneuvering zones" at 150 feet above the level of the airport, extending outwardly for 2 miles from the perimeter of the airport. Aircraft may maneuver and turn 150 feet above your house and mine without our permission or consent. Part of Cedarhurst lies within such "turning and maneuvering zone."

In the case of *Roosevelt Field* v. *Town of North Hempstead* (88 Fed. Supp. 177), one of our great Federal judges described such zone as follows (p. 189):

> From the standpoint of the aviator, the turning zone is considered to be a part of the airport. But the law has not so decreed. It is a space in the air, not lying above the airport, but adjacent to that which does, in which supervision for the purpose of ordered navigation is vested by law in the CAA, but that supervision is by no means synonymous with appropriation; it has for its objective an intelligent integration of navigation on the part of aircraft, in their relation one to the other.

The Administrator has also prescribed "approach zones," which are ramps or inclined planes rising outwardly from the usable area of the airport at an angle of 1 foot in 40 feet, that is to say, a tributary or channel arising from the usable part of the airport, 1 foot in height for every 40-foot distance from the usable part of the airport. Such a tributary to the navigable airspace would be 8 miles long before reaching the navigable airspace.

The tributary to runway 31 right and to runway 13 left passes over Cedarhurst at approximately 250 feet at the village's northwest boundary and at approximately 350 feet at the village's southeast boundary. In other words, there has in effect been erected in the superadjacent airspace over Cedarhurst, a structure consisting of a channel or tributary or corridor for the passage of aircraft taking off from runway 13 left and for landing on runway 31 right, without making provision for a landing of a malfunctioning aircraft outside the congested area and without the acquisition of any of the property rights of the residents of Cedarhurst, the owners of the adjacent land. This, the villge claims, is an appropriation of the superadjacent airspace and of the subadjacent land for public use without compensation of any kind.

Also, he has purported by regulation 525, to regulate the height of structures within 16,000 feet from the landing area to a maximum height of 200 feet. Sixteen thousand feet is roughly 3 miles. Any structure of greater height is deemed by the Administrator a menace to air navigation. Such regulation of the use of the superadjacent air would put at issue immediately the reasonableness of the regulation and its constitutionality as a taking of property for public use without proper compensation.

The residents of Cedarhurst realize the need for tributaries of the navigable airspace. Of necessity, aircraft must land; and they cannot stay aloft without power, for their buoyancy is created by their speed through the air, and to maintain such power, refueling at frequent intervals is necessary. They realize that the needs of commerce require that aircraft, like oceangoing vessels, must have space areas for "docking," that is to say, for receiving and discharging their passengers and

freight at or near their points of departure and arrival, and cargo at or near the points of transshipment. They claim merely that tributaries have to be established in property, either land or air or both, properly acquired and paid for.

There is a difference between the tributaries to the high seas and the tributaries of the navigable airspace. Navigable waters were confined within and bounded by land areas created by nature and easily charted. Navigable airspace and the tributaries thereof have not thus been defined by nature. The airways and the tributaries thereto have to be created. If private property is needed or used for that purpose, constitutional processes must be instituted and followed.

In the Roosevelt case supra, page 187, Judge Byers said:

> There has been no taking, since neither statute nor regulation purports so to operate. Title 49, United States Code, Annotated, section 452 (c), indicates that when Congress intended to provide for the condemnation for "easements through or other interest in airspace" it knew how to legislate in express terms.

At common law, the owner of the subadjacent land was said to own all of the air above his land to the zenith. This rule has been changed:

> Ancient doctrines of private ownership of the air as appurtenant to land titles had to be revised to make aviation practically serviceable to our society.

That was Mr. Justice Jackson in 333 United States Reports 103, 107.

It may be said that the owner of the subjacent land now owns all of the superadjacent air not appropriated by congressional action; that is to say, at the present time he owns up to the navigable airspace because the navigable airspace is all that Congress has appropriated. The superadjacent airspace is the residue of his old common-law title still left to the subjacent landowner by Congress.

Where the health and general public welfare of a community is affected, the board of trustees of the village have the power to legislate in the public interest. By virtue of such powers, zoning ordinances have been justified in the exercise of the police power of the State (*Welch* v. *Swasey*, 214 U. S. 91).

Airspace surrounding habitations has been regulated; minimum front yards, side yards, and rear yards have been prescribed, all in the interest of the general public welfare and health of the community. The Cedarhurst ordinance is simply an extension of that power. Having found that low-flying aircraft adversely affected the health and general public welfare, the village exercised a right, which it believes it has, to prescribe the use of the airspace not yet appropriated by Congress, and, until Congress acts, the village has created a new airspace restriction. The ordinance does no more than insist that the civil air regulations and the law of the State of New York prescribing minimum safe altitudes be enforced and implemented.

To use the colorful expression of the mayor of Elizabeth, the village of Cedarhurst has simply raised "the umbrella of death" to an altitude which would enable malfunctioning aircraft to make landings outside the area of the village.

The needs of the expanding air commerce require that the tributaries of the navigable airspace be defined as approach zone through the superadjacent airspace about 2,000 feet wide, and that the subjacent land be acquired and all dwellings thereon razed. It is necessary for malfunctioning aircraft while "landing and taking off" to have uncongested areas beneath them so that they can come to earth

without collision with habitations. These approach zones, cleared of habitations, would permit aircraft with power or mechanical failure to avoid the holocausts suffered by Elizabeth.

Therefore, we make the following recommendation:

(1) Amend title 49, United States Code Annotated 403, by adding to the end thereof a definition of "navigable airspace." The definition might follow the regulation of the Administrator of Civil Aeronautics. I should prefer to see the navigable airspace defined as all air above 2,000 feet. With the advent of faster, heavier, and noisier aircraft, 1,000 feet seems utterly inadequate. I would recommend also—

(2) Adding a section 403 (a) in words or substance as follows:

Aircraft for the purpose of landing and taking off may navigate below the navigable airspace through the tributaries of the navigable airspace prescribed by the Administrator of Civil Aeronautics.

(3) I also suggest adding a section 403 (b) of title 49, in words or substance as follows:

It is hereby declared that the owner of surface land owns all of the air above such surface land to the navigable airspace, as defined in this chapter, to the full area of such surface land. Flight in said airspace is prohibited except in the tributaries to the navigable airspace, as set up by the Administrator of Civil Aeronautics.

This would enable the authorities to punish buzzing and other unnecessary low flying.

(4) I further suggest that the tributaries to the navigable airspace should be defined by law, upon recommendation of the Administrator, and funds provided for the acquisition of the needed subjacent land and superadjacent air. As soon as this is done, the cheaper it will be.

I also recommend that the law provide:

(5) Turning and maneuvering zones should be declared to be not less than 1,000 feet above the level of the airport.

In conclusion, boiled down, my recommendations mean that pilots or malfunctioning aircraft are entitled to have some place to ditch aircraft in cases of necessity. I don't know what caused the disasters in the Newark area, but I do know what must have gone through the mind of the pilot who said, "I can't make it back." Had he had the proper navigable airspace without inhabitants or habitations, he could have possibly avoided a collision, he might have saved his passengers, and he may even have saved his aircraft, but without a place to ditch his craft, what was he going to do? When aircraft takes off over a heavily congested area and he has trouble while trying to gain height, he can't look too far ahead of him and, if ditching is necessary, under our present set-up it is impossible for him to do so and a tragedy or disaster results.

Thank you very much, gentlemen.

Mr. BECKWORTH. I would like to refer Mr. Moore to the Federal Air Act, where he will find certain of the legislation that he refers to.

Mr. MOORE. Yes, and Judge Byers tells us that title 49, section 452 (c), indicates that when Congress intended to provide for the condemnation for easements through or other interest in airspace it knew how to legislate in express terms. I think Judge Byers was predicting that this express recommendation and legislation would be made because air commerce has grown rapidly. I think a plane of tomorrow will be even noisier than it is today, with jets and immense

power plants, and in the near future we will be subjected to greater noises than we are today.

Mr. BECKWORTH. Thank you very much, Mr. Moore.

The next witness will be Mr. Irwin Klein. Mr. Klein is president of the Cedarhurst Home Owners Association.

STATEMENT OF IRWIN KLEIN, PRESIDENT, CEDARHURST HOME OWNERS ASSOCIATION

Mr. IRWIN KLEIN. Mr. Chairman and gentlemen of the committee, I address these remarks to you as president of the Cedarhurst Home Owners Association, Inc., and as a resident of and a home owner of the incorporated village of Cedarhurst, Long Island, which is located approximately a mile and a quarter from the southeast approach of runway L–1331–R of Idlewild-International Airport. Our committee on aviation has been in Idlewild twice to meet with the officials of the various agencies and authorities, and have been afforded the courtesy of being flown over the runway in a helicopter and also in a TWA Constellation.

Our committee on aviation has discussed the problems of the villagers of Cedarhurst arising by reason of the close proximity of the airport and runway L–1331–R in particular, with the officials of the New York Port Authority, the Civil Aeronautics Administration, the Civil Aeronautics Board, the Airline Pilots Association, the Air Transport Association, and the superintendent of the airport.

The problems of the citizens of any congested community near a major airport are twofold:

First, there is the danger of falling planes, and, secondly, the injury to health and the nervous system by reason of the noise and vibration caused by the propellers and engines.

The advance of the aviation industry has been phenomenal. The brilliance of the scientific and technical personnel in the aviation industry has been directed to improvements in speed, load-carrying capacity, and economy in cost of travel. Each such advance creates additional hazards and dangers. We must make certain that the advances in safety measures keep pace with those other scientific advances in speed and load-carrying capacity, and so forth.

In this connection there has been concentration on air safety only and none for safety to the man on the ground except as incidental to air safety.

However, no efforts to speed up safety measures are ever taken until the need therefor is brought home forcibly to the attention of the aviation officials by a series of successive disasters or public clamor, and then only will steps be taken to remedy existing conditions so as to prevent recurrences, but—and I make this point most emphatically—no precautionary measures are ever taken in advance voluntarily.

If the aviation officials were fully aware of the situation surrounding their particular airport and had the vision and foresight to plan safety in advance, there would be no public clamor and no need for this type of congressional hearing, but the fact that this hearing had to be called to investigate the situation is a clear indication that the situation is grave and that someone should do something about it. The ultimate solution will be scientific.

Meanwhile, we as citizens and you as elected representatives of the citizens can expedite and shorten the effective time of the safety program.

I believe we all recognize if a plane is high enough over a congested area, in the event of a power failure, its angle of gliding will take the plane outside of the congested area and into an uninhabited area, and thus avoid disaster to the man on the ground.

Conversely, if the plane is too low over a congested area when a power failure occurs, it must necessarily crash into a congested area.

The Federal law states that a plane must maintain an altitude of 1,000 feet over congested areas except when landing or taking off. Let us suppose that the landings and taking-offs occur over a congested area, which is the situation we have here in Cedarhurst. In such a situation, precautionary and safety measures must be taken. Let me suggest several:

(1) Proper forethought as to location of airport: In this connection, public hearings and consultations with representatives of affected communities should be held before final decision as to location is made.

(2) Proper forethought as to flight pattern, bearing in mind that newer aircraft will be heavier and faster: In this connection, Idlewild Airport originally had a 3-mile flight pattern which did not affect the village of Cedarhurst, but this was changed to a 5-mile pattern, which does carry the planes over the village. If this had been properly planned in advance, the airport or runway could have been set further back so that, even with a 5-mile flight pattern, planes did not fly over Cedarhurst.

(3) Where possible, have runways point in the direction of water and wasteland.

(4) Eliminate or curtail use of runways facing congested areas, and divert air traffic to other parallel runways not approaching congested areas. In this connection, I recommend that Idlewild runway L–1331–R be activated for day and night flights as soon as possible, and that landing lights and taxi strips be installed without delay. The activation of this runway, plus the discontinuance of the use of the southeast end of runway L–1331–R, will alleviate the existing condition of low-flying aircraft over the village of Cedarhurst.

(5) Lengthen runways and have them set back so that planes will be airborne sooner and reach greater heights over congested areas. In this connection, I would suggest that Idlewild runway L–1331–R be lengthened, and that the use of the southeasterly approach thereof be discontinued for landings and take-offs.

(6) Restrict certain runways, particularly Idlewild runway L–1331–R, to use for fighter planes such as two-engine planes whose angle of ascent and descent are sufficient to acquire a safe height of 1,000 feet over a congested area; namely, Cedarhurst.

(7) The installation of a preferential runway system, and in this connection I would fix responsibility for the choice of the particular runway upon the tower—that is, the Civil Aeronautics Administration—and not allow the pilot to supersede the instructions of the tower by making his own choice of runways.

At this point, I would like to say that officials of the CAA and the port authority last Saturday, when they were asked why the pilot was given the last word, said that the pilot is like the captain of a steamship, but I would like to point out that the captain of a steamship de-

pends upon the harbor pilot to bring his ship into port. I say that the CAA should be fixed with the responsibility for designating the runway to be used.

Now, coming back to the suggestions:

(8) Acquire subfields in outlying areas for training flights and shift training flights to such subfields.

(9) Require all planes to be equipped with the latest safety devices, among which is the cross-wind landing gear, which will permit planes to land on a particular runway and avoid others regardless of the direction of the wind.

(10) Require stricter enforcement of pilot compliance with flight regulations.

(11) Eliminate decentralization of the various agencies which make for inefficiency due to gaps and gores and overlaps in authority, and to fix responsibility upon one agency.

(12) The man on the ground should be represented on such an agency.

(13) Enactment of an appropriate ordinance by an affected community to insure safety to the inhabitants thereof and to insure that the aviation officials take proper precautionary measures themselves; and, as I have already pointed out, unless there is pressure by the affected public, nothing will be done by the aviation officials in the way of safety and precautionary measures to protect the man on the ground.

(14) Use every other precautionary and safety measure in connection with the danger of low-flying aircraft over congested areas and the injury to the health and nervous system caused by the vibration and noise of such low-flying aircraft.

From my personal contact with the home owners and residents of the incorporated village of Cedarhurst and my personal investigation of the matters referred to by me, it is respectfully recommended that this congressional subcommittee take immediate and appropriate steps to remedy the situation complained of.

Thank you, Mr. Chairman and members of the committee.

Congressman KLEIN. This runway you are talking about, L–1331–R, is that a new runway that has been opened up?

Mr. IRWIN KLEIN. Yes, sir; a new runway parallel to the Bay, opened in the last 3 or 4 days for daytime use. There are no lights on it yet.

Congressman KLEIN. Does that help the situation at all?

Mr. IRWIN KLEIN. In the daytime it does.

Congressman KLEIN. If it were open at night, would it help?

Mr. IRWIN KLEIN. Yes; it would help more, and they need a taxi strip there. However, that other runway runs parallel to that and runs close to Cedarhurst, and the heavier planes cannot rise to a safe altitude. I suggest that it be lengthened in a northwesterly direction and, furthermore, I suggest that you use a new one for heavier planes.

Congressman KLEIN. Have you talked with anyone at the port authority about putting the night lights on that runway?

Mr. IRWIN KLEIN. Yes, sir.

Congressman KLEIN. What did they say?

Mr. IRWIN KLEIN. They say that they are going to try to do it.

Congressman KLEIN. Does that take much time?

Mr. IRWIN KLEIN. I don't know what they have to do in order to do that. I know they have to meet and get the funds. The lights themselves will only take 3 or 4 months to install, but the taxi strip will take much longer.

Congressman KLEIN. That might do much toward eliminating the flying over Cedarhurst?

Mr. IRWIN KLEIN. Yes; together with restricting the southeast end of the present runway and letting the planes go to the northwest instead.

Congressman KLEIN. I have no further questions.

Mr. BECKWORTH. Thank you, Mr. Klein.

The next witness will be Mr. Charles Goldman, president of the Cedarhurst-Woodmere Civic Association, Inc.

STATEMENT OF CHARLES GOLDMAN, PRESIDENT, CEDARHURST-WOODMERE CIVIC ASSOCIATION, INC.

Mr. GOLDMAN. With the advent of heavy airborne cruisers, living in suburban communities near airports has taken on a new concept. Whereas, prior to the time of air transportation, life in a suburban town was quiet and peaceful, we now find our existence is nerve-racking and dangerous, and residents live in constant fear of disaster.

Low-flying planes have become a nuisance and a menace, as they are daily trespassing on our privacy to such an extent that the health, safety, and general welfare of the people have become vitally affected. Although conditions are undoubtedly the same throughout the United States, I will address myself to the subcommittee on the situation as it exists at Idlewild Airport.

Large transport planes approach and depart from International Airport and fly at low altitudes over the villages of Cedarhurst and Woodmere at all hours of the day and night. The planes fly so low that the identification numerals on the underside of their wings are easily discernible, creating great noise and vibration and causing the following results:

(1) The sleep of the residents is disturbed, causing impaired physical and mental ability, loss of appetite, loss of weight, and extreme nervousness.

(2) Children are particularly affected by interrupted slumber so that their standing in school is seriously affected and impaired.

(3) The incidence of neurosis among the residents has inclined sharply upward.

(4) The buildings, by reason of the vibration, have been damaged and walls have cracked.

(5) Property values have been depreciated, and the villages have become generally known as undesirable places to reside and do business.

(6) The noise of the aircraft drowns out normal traffic signals, endangering the life and limb of pedestrians crossing streets.

(7) Proceedings in schools, churches, and places of public assembly are interrupted with great frequency for periods of time of varying duration.

(8) In the opinion of medical experts, nervous conditions of residents induced or aggravated by said low flying, if permitted to con-

tinue, will result in permanent injury to the health of the residents.

(9) Apprehension and fear caused by the noise of approaching aircraft, loaded with many gallons of high-octane gasoline, are fast becoming fixations, particularly in children.

Let me point out that the above findings are not fancied, imaginary, or my own. They are all borne out by sworn testimony taken at public hearings as recently as December 10, 1951, and January 14, 1952, at the instance of the board of trustees of the village of Cedarhurst.

I would like to quote some of the sworn statements of a few residents of the village of Cedarhurst given at these hearings. [Reading:]

Mr. DANIEL J. MURPHY. Well, innumerable times during the past 2 years or more, at least particularly during the summer season, airplanes leaving and entering the International Airport and Idlewild have come so close to my house as to prevent me from sleeping, to cause my house to vibrate and also blank out all conversation, telephone and otherwise. I have ceilings in my house showing new cracks have developed since these said low-flying planes have been operating close to my house, causing it to vibrate; and I have personal knowledge of this condition for the reason that I personally filled all the cracks in the walls and ceilings in my house soon after the house had settled and long in advance of the approach of these low-flying planes.

I was advised by my physician to get as much rest as possible at night. In an effort to follow that advice, I retired several times before midnight during the above-mentioned period only to be awakened with a start repeatedly when a plane lowered out of International Airport directly or nearly directly over my house, at a very low altitude and shortly before midnight, night after night. The noise and vibration caused by said low-flying planes rendered sleep impossible, not only for myself but for my family. Many times other low-flying planes approaching the International Airport, and presumably traveling over the same course, but in reverse, thundered past around 4 or 5 o'clock in the morning on many occasions, causing the same annoyance, noise and vibration, in large amount.

Then there is the testimony of Max Zenn, as follows:

We have been awakened many times, many times—of course, more so in the summer with the windows open wider than at this time of the year—by planes flying so low that you can't help but be awakened at once, and I personally have always been a good sound sleeper and never had any trouble sleeping; but, with the airplanes being so close, not only the noise but the vibration must wake one up.

The children have at times been frightened by the low-flying planes. The planes are so low that the shadow comes right across the lawn, like a huge airplane itself being on the lawn. With the vibration of the motor and the shadow, it would frighten anyone, particularly children.

Then there is the testimony of Mrs. Florence Meiselman [reading]:

I am a very sound sleeper, but I have been at times up many times during the night, not only by the planes going overhead but it seems they do something at the airport at night, either warm up the engines or test the engines or repair the engines. I don't know what it is, but it sounds like an entire fleet of planes all going at one time, and you can hear the constant "grr-grr" and it is just as plain as if it was in the room with you.

Also, the testimony of Mr. Edward Rothenberg as follows:

I want to add the fact that I had damage done to my home in the form of cracks, and my young child—I have two children—have become slightly neurotic and lost several pounds of weight. I am endangered not only for my life and health here but my health at my place of work. I am a chemist, and I handle poisonous, deadly acids and other chemicals that can prove to be explosive under certain conditions, and if I am not fully awake to make sure—and I am not many times during the summertime because of loss of sleep—my life is then endangered. The life of my people who work with me is in danger also. In fact, I can blow the whole laboratory up if it becomes serious enough. I have to be fully awake. I work for the Federal Government, and the responsibility is extremely great.

Because of the pressure of time, I have cited but a few cases showing the impairment to health and the danger to property caused by low-flying planes.

It is also interesting to take note of the testimony of a few doctors who testified at the aforesaid hearing. I will take the testimony of Dr. Alfred B. Newman, consultant in children's diseases, which is as follows:

Well, my experiences were of late relevant to two elements in my practice among children and infants in the community.

One is the problem relative a bit to the acutely ill child and also to the well child of the community. As far as the acutely ill child of the community is concerned, there is no question about it. As a matter of fact, in practice and experience—and I have confirmed this in speaking to more and more of my colleagues—we have found over the last few years that the problem of the low-flying plane, as it affects this community with the acutely ill child, has created a distinct disturbance at night as far as their recovery and convalescence goes. We have more and more frequently been consulted with regard to problems of interruption of sleep among these acutely ill children. It certainly has disturbed their convalescence.

As far as the problem of low-flying planes in the daytime is concerned, that problem is not, of course, as acute as it is at night. I personally have been approached by a number of mothers of these children, asking me what could be done. I have told them on many occasions it is a civic problem. It is not a problem related to a medical condition. We have seen children and their acute illness unquestionably retarded in their convalescence by this disturbance of their sleep at night.

And, then, of course, the second phase related to the well children, and here the problem, I think, is even more widespread and certainly more acute, because, unfortunately, the child population being primarily a well and healthy population, the numbers affected are naturally greater. Among the well children, the disturbance during the day is—in all good common sense, I must say is no problem at all, but at night it has become a distinct problem over the last few years.

We have seen a distinct increase in sleep disturbance among these children, and I would say without any hesitation, not only in the interruption of sleep but in the nervous manifestations which have arisen as a result of this sleep disturbance of these children. I would say that without hesitation, and I think in good conscience we have seen a greater increase of nervous manifestations from these sleep disturbances.

I have seen a distinct increase in the problem of bed wetting among children. I have seen an increase in the problem of disturbed dreams and nightmares, and of somnambulent children—walking in their sleep—that have been described to me on more than one occasion. Whether we can distinctly relate this to the problem of sleep disturbance is hard to say.

Then there is the testimony of Dr. David Siegel, a general practitioner, as follows:

Well, personally, I don't make any notes on any of my records regarding these things, but I have received a number of complaints from mothers who have told me of their children being suddenly awakened at night from the noise and the vibration caused by some of these planes. I have had that complaint a number of times. I have also run into cases where I have had some people who were very sick and I tried to give them sedatives in order to quiet them down, to give them some rest, and, when you think you have them under control, along comes one of these things and up they are, and it is really—at least I feel that it has done some harm to some of these patients.

Many times in the midst of examining a patient, especially with a stethoscope, I will have to stop and wait until the noise clears up because I can't hear a thing.

Then we have the testimony of Dr. Max Zuger, a psychiatrist, who sums up the entire situation as follows:

During the past 5 years, patients and neighbors living in the five-town area have been complaining to me that the low-flying and roaring planes have made

them feel very tense and rather concerned that sooner or later something dreadful will happen. Many of them have been awakened in the middle of the night trembling and the feeling that something dreadful will immediately occur. During this period, when they are not yet fully awake, they get into a panic state, with a feeling that they will die. Shortly after that, when the roar is at a distance and the vibrations diminish and the person is a little bit more awake, they then begin to tremble, heart beating fast, and to be unable to go back to sleep. The result is that there is a general feeling of exhaustion and fatigue, definitely impairing their efficiency in their work.

Now, gentlemen, these are conclusions, not my own but based on actual testimony taken by the trustees of the village of Cedarhurst, as I have already stated.

I tell you these things because the people are awake to the dangers emanating from the low-flying planes. We expect that Congress will take into consideration a man's home and consider the man on the ground generally, so that he can live decently and quietly in the community.

As president of the Cedarhurst-Woodmere Civic Association, I want to sincerely impress upon you that the menace is serious and real. Steps must be taken now to abate and eliminate the nuisance. The people do not want to stop the progress of aviation but they do not want another disaster in their backyard. We feel that the person on the street, in his home, and on the ground generally is entitled to and should be given consideration.

We respectfully ask the Congress of the United States to enact, as soon as possible, such legislation that will insure safety and the general welfare of the public, and make our community a better, healthier, and safer place in which to live.

Mr. BECKWORTH. Thank you very much, Mr. Goldman. You may be sure what you have stated will be very carefully considered by this committee.

STATEMENT OF LOUIS WINER, DEPUTY COUNTY ATTORNEY, NASSAU COUNTY

Mr. WINER. I am here representing the county of Nassau. The county is grateful for the keen interest shown by the committee in conducting its meeting here.

The airport known as Idlewild, consisting of 5,000 acres, located within the city of New York, is immediately adjacent to Nassau County.

The interest of the county, of course, is the interest of the people who reside in the immediate section directly affected as a result of the complaints made here today.

The position of the county is that we would like to cooperate with the committee in any way the committee may see fit in the future toward making any proposals that will correct the present situation. It occurs to us that perhaps a solution might lie in the report your committee ultimately will make. As your chairman stated, you are making a study not only of this particular airport but all around the country.

Now, there is a three-phase program; that is, the activity of the port authority, the CAA, the pilots' association, and the executives who have anything to do with the operation of these airports and independently connected with the operation of the airports. The only

thing lacking is that we have a lack of coordination, and it might very well be that through the influence of this committee you may accomplish some constructive and much-needed improvement in the problem facing us today. We are back of the communities, and particularly the officials of the Cedarhurst area represented by Mayor Eldridge and other members of that organization and the civic organizations. We hope that you will find a solution to the problem that is confronting us, and you may be sure that we will cooperate with you in every possible way.

Mr. BECKWORTH. Thank you, Mr. Winer.

The next witness will be Mr. Palmer Farrington.

STATEMENT OF PALMER FARRINGTON, OFFICE OF TOWN ATTORNEY, HEMPSTEAD, N. Y.

Mr. FARRINGTON. I represent the office of the town attorney of Hempstead municipality, located in the southern portion of Nassau County. We have over 450,000 residents in that territory. I have nothing further to add to what has already been said except to put on the record the feelings of the people of this community, in which they express their gratitude to this committee in its endeavor to secure the safety of the residents around Idlewild and LaGuardia Airports.

Whatever action is necessary by the town board will be taken to support any measure adopted in the future looking toward that end.

We thank the committee for giving us this opportunity to present the facts as we know them, and we will be happy to lend our support to any constructive suggestions made by this committee, and we will lend our support to the local communities to protect their welfare as well as our own.

Mr. HALL. I would like to have the record show that Mayor Eldridge is here but does not want to make a statement.

May I express to you my appreciation for your courtesy in the fine treatment of us here, in view of the fact that I have to go to another meeting.

Mr. ROSS. If I may express to the committee the regrets of Congressman Henry Latham, who cannot be here because of leave of absence.

Mr. BECKWORTH. We would have been happy to have Congressman Latham here.

The next witness will be Mr. Louis C. Moser, president of the North Queens Home Owners Civic Association, of Jackson Heights.

STATEMENT OF LOUIS C. MOSER, PRESIDENT, NORTH QUEENS HOME OWNERS CIVIC ASSOCIATION

Mr. MOSER. My name is Louis C. Moser, and I am president of the North Queens Home Owners Civic Association, 35–25 Seventy-seventh Street, Jackson Heights, and also represent other property owners within the vicinity.

This hearing, of course, came, unfortunately, at an inopportune time for me, in that it did not give me an opportunity to prepare myself as I would have liked to have done. However, I have brought some bulletins and a lot of news items which will be most descriptive of the problems of the residents of Jackson Heights.

The North Queens Home Owners Civic Association very much appreciates this hearing and the opportunity to present its views on the subject of airports in cities, particularly LaGuardia and International Airports. The members of the association live in Jackson Heights, N. Y., an area adjacent to LaGuardia Field, and on the extension of runway 4–22 of that field.

Jackson Heights is a very heavily populated area, composed, for the most part, of one- and two-family residences and apartment houses. There is but little industry. The area may fairly be denominated as a residential area. It lies southwest of LaGuardia, and runway 4–22 leads directly over it, and on over the adjacent communities of Woodside, Sunnyside, Maspeth, and Long Island City, all of which are largely residential communities.

Since the building of LaGuardia Field, the residents have repeatedly complained of the noise of aircraft and the obvious danger from such aircraft. During this period of 12 years there has been no relief. In fact, as airplanes have become larger and as traffic has increased, the situation has become worse and still worse. The element of danger has been made clear by three recent airplane crashes at Elizabeth, N. J., and one at LaGuardia. There was also a crash of large proportions at LaGuardia in 1947.

Scarcely a week passes but that the papers report a near-crash landing at LaGuardia or a defect in an airplane after it is airborne that requires it to go back to the field for repairs. In spite of the statistical fact that airplanes afford a relatively safe means of travel, the threat of destruction constantly hangs over the heads of the people who have homes in this area. The same threat is true in the case of International Airport, and, in fact, any airport located in a large city.

Our association bears no ill-will toward air transportation. In fact, our members recognize its importance and acknowledge that it will continue to grow, as it should. But we do believe that the communities adjacent to airports, as they presently exist, are being asked to give far more than their just share toward the welfare and future of air transportation. We are being asked to make our ordinary and proportionate share of the funds in the way of taxes, and we are also having our homes, our peace of mind and comfort, and our well-being taken from us.

The element of noise is one that is difficult to describe. The difficulty seems to arise out of the fact that everyone has heard the noise of an airplane in his own house, but that ordinarily is a noise from an airplane some comfortable distance in height. But everyone has not heard the noise of 200 to 500 airplanes a day, at a height of less than 500 feet. That remains the lot of those of us who have the misfortune to live close to airports and on the extensions of runways.

It is a simple, inescapable fact that the city of New York, the Port of New York Authority, the Civil Aeronautics Administration, and the Civil Aeronautics Board have never taken noise measurements in the community. It has remained necessary for this to be done by a private citizen of Queens, Dr. H. A. Poeler, who, by the way, is a physician. The results of those measurements are as follows—beginning with the introduction:

The roar of low-flying planes in Queens has reached such unbearable proportions in recent months that the author has set out to make a series of sound level

measurements in several typical locations in Queens. In this manner, the magnitude of the problem can be presented in engineering terms to the public officials who are responsible for the present condition.

All sound level readings were taken in decibels with a calibrated General Radio Co. sound level meter, type 759-B, an instrument standard in the field of sound level measurements. The measurements were taken at three locations, all in line with runway 4–22 of LaGuardia Airport: (1) At a two-family house on Forty-ninth Street off Skillman Avenue, in the ground-floor bedroom and outdoors at ground level; (2) at a private house on Seventieth Street off Northern Boulevard, outdoors at ground level; (3) at the intersection of Twenty-third Avenue and Grand Central Parkway, outdoors at ground level.

Before proceedings with the report, we must stop to give an explanation of a unit unfamiliar to most readers, the decibel.

The decibel is the scientific unit of sound level or loudness, in the same manner that the second is the unit of time. The scale of sound level runs from 0 decibel to 140 decibels. An average person will have a hearing threshold of 16 decibels, below which he hears nothing, and will experience pain for sound levels above 130 decibels. Some typical sound level values will help the reader appreciate the decibel scale: a quiet library, 40 decibels; an average restaurant, 50 decibels; a large department store, 60 decibels; a printing press, 80 decibels; the noisiest location at Niagara Falls, 90 decibels.

The properties of the human ear dictate that the scale for loudness measurements cannot be a linear one, like the scales for time, length, and weight with which we are all familiar, but the scale must be logarithmic.

The logarithmic properties of the decibel are best illustrated by a few examples: Two equal noises when sounded simultaneously will produce a noise 3 decibels higher in sound level than either alone; 10 equal noise sources, when sounded simultaneously, will produce a noise 10 decibels higher than one alone; a hundred will produce a noise 20 decibels higher than one alone; a thousand will produce a noise 30 decibels higher than one alone; and 10,000 will produce a noise 40 decibels higher than one alone.

Hence, one cannot appreciate what a tremendous increase in loudness an increase of 40 decibels represents. Remember this as you read the sections on airplane noises in the residential areas of Queens.

Location 1 represents a typical bedroom 2.3 miles from the end of runway 4–22 at LaGuardia Airport. Readings were taken with one window open, and at 3 feet from the window, at the level of the bed. The normal background noise level measured at this location was 40 decibels before 11 p. m., and 35 decibels after 11 p. m. Readings of the noise level of low-flying planes, however, repeatedly reached values as high as 93 decibels. To appreciate the outrage of a noise of this sound level, we must point to 93 decibels as the sound level that has been measured at the loudest part of Niagara Falls. To make matters even worse, the planes do not cease flying over this location at 11 p. m., but continue far into the night.

Outdoor noise levels on a residential street in Queens exceed recognized limiting noise levels by 60,000 to 1.

Outdoor measurements in front of a private home on a typical residential street, location 2, in Queens, 1.3 miles from the end of runway 4–22, gave readings as high as 108 decibels. Relating this noise to the 93 decibels of Niagara Falls as a reference, this means that a noise level of 108 decibels is equivalent to the noise made by 30 Niagara Falls roaring simultaneously—if such a thing is conceivable. Honeymooners who wish to experience this sensation need only go to Seventieth Street off Northern Boulevard and wait for a four-engine plane to swoop over on take-off. They will not have to wait too long.

It is of considerable importance to compare the sound levels reported above to limits recommended for health and comfort. As reported by Dr. Vern O. Knudsen in the July 1949 issue of the Journal of the Acoustical Society of America: "Sound levels issuing from a building, when measured at the boundaries of the property on which the building is located, should not exceed the following values: (*a*) When surrounded only by business property, 75 decibels from 7 a. m. to 11 p. m., and 65 decibels from 11 p. m. to 7 a. m.; and (*b*) when any portion of the lot boundary is adjacent to a residential zone, 70 decibels from 7 a. m. to 11 p. m., and 60 decibels from 11 p. m. to 7 a. m.

The 108 decibels reported above is 48 decibels above the level of recommended levels for residential communities after 11 p. m. A sound level increase of 40 decibels is equivalent to a sixty thousand-fold increase in sound power.

To picture this situation, consider the noise of the noisiest factory that would be permitted to operate in a residential community, according to the standards cited, to be set up by one very noisy machine. The noise of 108 decibels created by the plane is equivalent to the roar of 60,000 of these machines operating simultaneously.

Outdoor levels of the noise of low-flying planes measures on Forty-ninth Street off Skillman Avenue, Queens, after 11 p. m. at night repeatedly reached values as high as 100 decibels. This is 10,000 times above the recommended value for these hours. How the airlines are permitted to continue with such flagrant violation of the disturbance of the peace ordinance is a matter that would well bear investigation.

Noise levels in passenger cabins of planes compared to noise levels to which Queens residents are subjected?

In the words of a sound engineer of the Douglas Aircraft Co., as published in the Journal of the Acoustical Society of America:

> Pilots in the older noisier airplanes returned from the day's run completely fatigued on account of excessive noise and vibration, while those on the newer transports leave their work in fairly fresh condition.

Speaking of DC–4 planes, he continues:

> We expect a noise level less than 63 decibels above one millibar in the passenger cabin under normal cruising conditions of 65 percent power, with a very moderate soundproofing allowance.

The base accepted as a standard level for sound measurement is 0.2 millibars. For comparison with our measurements, we must convert the value 63 decibels above 1 millibar to the standard base. This gives us 77 decibels above 0.2 millibars.

We therefore have 108 decibels in a typical Queens street, 1.3 miles removed from the airport, and 77 decibels as a design level in the DC–4 plane. The difference is 31 decibels, which represents the difference between the noise of 1 machine and the noise of a 1,000 identical machine noise, all operating simultaneously in one place.

In a typical Queens bedroom, noise levels of 93 decibels have been measured. The difference between this value and 77 decibels is 16 decibels. This represents the difference between the noise of 1 machine and 40 operating simultaneously. Actually, this is a very generous comparison, since cabins of present planes are considerably more quiet than 77 decibels, but this value was used, since it was the only published value readily available.

Data support demand for two-engine plane limit for LaGuardia Airport:

Measurements at location 3, 1,000 feet from and directly in line with runway 4–22, lend support to the often-voiced demand of civic groups that operations at LaGuardia be limited to the two-engine planes. Representative readings at this location are: Noise of a two-engine plane, 100 decibels; noise of a four-engine plane, 112 decibels. The significant fact here is that the noise of a four-engine plane is 12 decibels above that of a two-engine plane. This means that the noise of a four-engine plane is equivalent to the noise of 16 two-engine planes flying overhead simultaneously. For airplanes that rise on a steady rate of climb, this means that all over the take-off area, which includes a large section of Queens, the noise of a four-engine plane would still be 12 decibels higher than that of a two-engine plane.

By limiting LaGuardia to two-engine planes, immediate relief could be given to Queens residents, and in the meantime a long-range solution, such as the complete closing of LaGuardia, could be worked out.

Appeal to the residents of Queens: From the article it may appear as though the primary danger to the residents of Queens is that of noise. A more dreaded fate awaits them, however, and fortunately for us, the noise serves as a continual alert to the real danger. Four-engine planes carry 3,000 gallons of highly inflammable gasoline. Since no machine is foolproof, no inspection is perfect, and no human pilot is infallible, the certainty exists that a plane will eventually crash into the densely populated residential districts of Queens, which are being used as runway areas for both landings and take-offs. The chance of an accident may be 1 in 10,000 or 1 in 100,000, or 1 in 1,000,000, but it is not zero. This means that if we permit the planes to fly over our homes long enough, a holocaust is certain to occur.

A crash of a plane carrying 3,000 gallons of gasoline would cover several six-story apartment buildings with a blanket of flames from which few survivors would emerge. The full extent of how rotten the situation really is is highlighted by the investigations of the Queens County Grand Jurors Association, which has repeatedly warned that foam fire extinguishing and fighting equipment is available in only four of the firehouses in Queens. The water fire-fighting equipment that is standard with the fire department would be totally useless against a gasoline fire such as would be produced by the crash of a plane carrying 3,000 gallons of gasoline.

Call to action: For the sake of the safety of your loved ones, as well as for relief from the Niagara-like roar of planes in your bedroom, the residents of Queens must take up the pen and open their pocketbooks to fight the low-flying plane menace.

That something can be done was demonstrated by the courageous example of Newark's mayor, Ralph A. Villani, who provided relief for the imperiled and sleepless residents of the Newark area by a two-barreled attack of a threat to lead a sit-down strike onto the runways of Newark Airport, and by the threat to revoke the port authority's lease on the Newark Airport. The immediate result was a change in the flight patterns, which now require take-offs and landings over the meadows and parks, instead of over densely populated residential areas.

LaGuardia Airport is operated by the same port authority that operates Newark Airport, but how different are the actions of our $45,000-a-year mayor. Not only has he failed to correct the low-flying menace to the 1.6 million population of Queens, but he now sees himself compelled to take a 4-week business trip to Italy. If it were not so tragic, it would be funny. Let your angry protests give the mayor cause to reflect as to the market value of his political stock.

What can we do? Write! Write! Write! And keep writing. Write, giving your name and address. It is urgent that you write at least one card immediately to each of the following, since the plans call for a stepping up of traffic at LaGuardia Airport:

1. Mayor Impellitteri.
2. The City Council of New York City, Municipal Building, New York City, which has pigeonholed a bill since February of 1951 that would control low flying over Queens residential areas.
3. Congressman L. Gary Clemente, in Washington, who has threatened to call for a congressional investigation of low flying over Queens.
4. Louis C. Moser, head of the North Jackson Home Owners Civic Organization, 35-25 Seventy-seventh Street, Jackson Heights, who is spearheading a drive to sue the airlines for trespass, and plans a mass meeting at Public School 69 early next month.

Sit down now and write, before it is too late.

Now, coming back to the problem before us, after having given you this analysis of the noise problem, it is the position of the North Queens Home Owners Civic Association that ordinary, commonly accepted individual rights are being taken by the landing and taking off of aircraft, without just compensation, and without warrant of law.

The matter of nuisance by low-flying aircraft has been considered by the United States Circuit Court in the case of *Swetland* v. *Curtiss Airports Corp.*, (C. C. A. Ohio) (55 Fed. 2d, 201, 83 A. P. L. R. 319), where the court said:

> The defendants have the right to establish airports, but they cannot lawfully establish one at a place where its normal operation will deprive the plaintiffs of the use and enjoyment of their property.

The court in question enjoined the construction of the airport, and in respect of nuisance, quoted from *Baltimore Railroad* v. *Fifth Baptist Church* (108 U. S. 317, 2 S. Ct. 726), as follows:

> This is a nuisance which annoys and disturbs one in the possession of his property, rendering its ordinary use or occupation physically uncomfortable to him. For such annoyance and discomfort the courts of law will afford redress by giving damages against the wrongdoer and when the cause of the annoyance and discomfort are continued, courts of equity will interfere and restrain the nuisance.

Flight of aircraft at a height lower than that which may be a nuisance, constitutes trespass. Such is the ruling of the Supreme Court in the case of *U. S.* v. *Causbey* (S. Ct. 2946) (328 U. S. 256, 66 S. Ct. 1062). There, the Court said:

> The landowner owns at least as much of the space above the ground as he can occupy or use in connection with the land. See *Hinman* v. *Pacific Air Transport* (84 Fed. 2d 755). The fact that he does not occupy it in a physical sense—by the erection of buildings and the like—is not material. As we have said, the flight of airplanes, which skim the surface but do not touch it, is as much an appropriation of the use of the land as a more conventional entry upon it (p. 264).

The factual circumstances in the Causbey case were such as to leave little, if any, doubt that trespasses are being committed day and night in Queens. The great difficulty facing the hurt property owners is the cost of litigation. Such a suit would be met with the opposition of the city, the port authority, the airlines, the Civil Aeronautics Administration, and the Civil Aeronautics Board. It would cost probably in excess of $75,000 and involve almost untold difficulty in the assertion of rights and of damages on the part of hundreds, perhaps even thousands, of plaintiffs.

However, such a suit should not be necessary, for all of the governmental agencies involved here have duties in respect to the airport, which they have failed to perform. Sections 351, 355, and 356 of the General Municipal Law of New York provided and contemplates that cities establishing airports acquire the necessary "real property or any interest therein including an easement" (sec. 351).

Sections 6609 and 6615 (CC) of the Unconsolidated Laws of New York, provide and contemplate that the Port of New York Authority shall acquire "air rights" and "easements" in, over, above, through, upon or under such real property.

Section 302 (c) of the Civil Aeronautics Act of 1938 (49 U. S. C. A. 452 (a)) gives the Administrator the duty of establishing "airways"

and subsection (c) imposes upon him the duty in so doing to acquire "real property, including easements through or other interest in air space, immediately adjacent thereto."

Thus, all of the governmental agencies have not only the right but the duty to acquire the air rights or easements necessary in the operation of airports. Yet, the simple, unadorned fact remains that not a single one of them has done so. On the contrary, they have directed their energies and their money in building airports with no regard for the rights of the property owners below. And all in the face of the fifth amendment to the Constitution, which provides that private property shall not be taken for public use without just compensation and contrary to the same provision in article I, section 7 of the Constitution of the State of New York.

The agencies of the Federal Government have been particularly remiss in their failure to observe the rights of individuals.

Section 601 (a) (7) of the act of 1938 (49 U. S. C. A. 551 (a) (7)), gives the Federal regulating agency the duty to prescribe "rules as to safe altitude of flight."

Section 1 (24) defines the "navigable air space" to be the "air space above the minimum safe altitude of flight prescribed by regulations issued under this act."

The Civil Aeronautics Board has fixed the "minimum safe altitude of flight" over congested areas at 1,000 feet, provided the pilot can in case of emergency land outside the congested area. But it has made an exception, a big exception, namely, "except when landing or taking off."

Thus, in respect to people on the ground, the "minimum safe altitude of flight" varies, depending on the location of a citizen's home. For example, for New York City generally, the prescribed altitude is 1,000 feet, with an additional proviso for a safe landing. On the other hand, as to those living in Jackson Heights, the minimum safe altitude is something quite different. There the "minimum safe altitude of flight" ranges from no height at all at the end of a runway up to 1,000 feet, the minimum safe altitude in other areas.

It is important to remember that in ordinary conditions a four-motor plane is rarely above 500 feet on a take-off at 5 miles from the runway. The distance is not much different on a landing, though the planes are supposed to enter the landing pattern at 1,200 feet. After that they come down as they wish or as they must. There is no effective minimum safe altitude of flight for the people of Queens.

As this regulation of the Civil Aeronautics Board fixes the "navigable air space," it is clear that it takes, under the ruling in the Causbey case, private property without just compensation, in clear violation of the fifth amendment to the Constitution of the United States.

It is a regulation that on its face is arbitrary and capricious, as it affects people on the ground.

The "navigable air space" in Queens County is at one height or a varying height of from no feet to 1,000 feet, and elsewhere it is at quite a different height, from 1,000 feet or higher.

It may be objected that aircraft must land and take off. True. But there is no requirement that they land and take off as trespassers. There is no requirement that the Civil Aeronautics Administration use Federal funds to aid in the construction of airports in cities where

landings and take-offs must be in violation of individual constitutional rights, both in respect to trespass and nuisance.

Furthermore, it is submitted that the Civil Aeronautics Administration has contributed funds to the construction of the New York City airports in violation of the Federal Airport Act, which throughout contemplates and provides for the acquisition of easements through or other interest in air space.

If it is necessary for airports to be in cities, then, on the basis of the law and all of the traditions of the United States, the people living in Queens County should be made whole in order that they may move to a place where aircraft are overhead less than 200 to 500 times a day, and also where the noise is tolerable, and at least where it is not applied at the rate of over 100 decibels.

But it is submitted that the future growth of the air industry is hampered by the city airports. Reports are common of a "stacking up" at LaGuardia for as much as 2 hours, waiting for an opportunity to land.

The members of the North Queens Home Owners Civic Association do not pretend to be military experts, but it appears to them that a target area, the city of New York, is no place for airports for the purpose of defense. They only add an importance to the target. If the target should by any chance be reached by an enemy, the airport, the means of defense, would at the same time be reached. The city as a defense mechanism would be affected, including the means of its defense, and an important element of transportation.

All of this story is not told in the existing circumstances. The port authority and the Civil Aeronautics Administration have recently made a study of the airports in the metropolitan area. They look forward to 1962 or thereabouts, and have planned for 480 air movements of aircraft per hour. Four hundred and eighty air movements per hour. I do not have a copy of that available, but it was prepared by the CAA and port authority of New York. It provides for a truly tremendous performance. These agencies, including the CAB, have been perfectly wonderful in their supervision of these complicated machines which give breadth and width to the capacity of mankind to arise from the ground and go to distant places; but there is just one thing that they haven't done, and that is to consider the people living in this area of Queens County. With the fruition of those plans, there will be aerial traffic congestion that will compare with that on Fifth Avenue, but no one seems to have considered that a bumped fender in the air is something quite different from a bumped fender on Fifth Avenue.

There is no improvement in sight that promises relief from the noise. The danger will always be present, as we are concerned with men and machines, neither of which are perfect. Error will continue to be inevitable, and error in an airplane is disaster.

I may digress for a moment to say I don't know how this committee will react to the knowledge of what it means on Saturday or Sunday to see little kids doing like this—shrinking in fear—or realizing the effect of a mother next door when her children awake crying in the night. I cannot describe these things to you so that you get a full realization of it unless you experience it yourself. You have to be under an airplane 300 feet above, and they can't go more than 500 feet in the air at the end of a 5-mile take-off run under ordinary conditions.

It is abundantly clear that if the airports remain in the city, the people ultimately will have to move elsewhere. It remains true that one is denied the peaceful enjoyment of his home when there are 300 to 500 aircraft above each 24 hours imposing noise that defies belief and understanding.

Now, this problem not only affects Jackson Heights, but, for your information, as far east of New York as London, England. We have coordination from many other districts, and they have the same problem that affects us and the city of New York, and they have been giving us information as to their experience in limiting or attempting to eliminate the conditions existing around airports, and one of the items that they have submitted to me and which in turn I have submitted to the borough president of Queens, concerns the problem when jet planes begin to use the airports and their effect on human beings.

I also refer to the committee the articles in the London Gazette covering this situation.

To save time, I suggest to this committee they obtain a copy of the minutes of the borough president's office, because we have gone into this situation in great detail on the question of safety, as well as noise.

I am not in a position to speak authoritatively on Idlewild Airport. However, I can speak of runway 4–22 of LaGuardia Field. I have here a photograph showing the approach to runway 4–22, which I ask you gentlemen of the committee to accept and to inspect. This is looking north, approximately one-half mile from runway 4–22, and then there is this other photograph looking south from runway 4–22. You will note within one-half mile of the approach to runway 4–22 there is this congestion of apartment houses. When the use of runway 4–22 for ascending is necessary, the planes will come approximately over here, that is, within 25 to 50 feet and the conditions affecting the property is evidenced by the breaking of plaster and the cracking of the walls and because of the tremendous noise and vibration created, we are no longer able to enjoy our radios normally, because we cannot listen to the conversation and music, nor can we hear the conversations over the telephone at home.

If you study these maps, you will note that if at any moment—a particular moment when the plane is approaching these homes, any defect occurs in any part of the plane, that plane would have to crash or make an emergency landing and go right into the homes adjacent to the field and these homes are adjacent within 25 to 50 feet of runway 4–22 and there are homes all along the path approached by the planes for take-offs or landings.

We have taken this matter up with numerous groups, the Civil Aeronautics Administration, the Civil Aeronautics Board, the Port Authority of New York, and I won't say that they have not attempted to cooperate with us. They have. However, in a recent letter dated February 21, the Civil Aeronautics Administrator, C. F. Horne, wrote a letter which is just the type of problem that we have here and especially concerning runway 4–22, which travels through the most heavily populated areas where our homes are located, as well as over the adjacent communities of Woodside, Sunnyside, Maspeth, and Long Island City, all of which are largely residential communities.

Then we have the situation of the planes flying over Manhattan and they cannot go over 800 feet about the highest buildings there

because it is impossible for them to make any higher altitude and should they strike an office building in Manhattan—people say they can go higher, but they can't do it because they are too heavily loaded, and by the time that they reach 800 feet and if they did have an accident it would wreck disaster. As a matter of fact, a plane did strike the Empire State Building, and it is surprising that more buildings have not been crashed into in this area.

This is not a problematical situation; it is something that faces us daily and something that we have to eliminate.

Now, in the letter from the Administrator of Civil Aeronautics Administration they advise us that they have no authority to regulate the operation of our airport, because airports generally are owned or operated by the local governments. Therefore, any request to eliminate runway 4–22 or close LaGuardia Airport should be made to the port authority.

We called them, and they told us that we must get in touch with the Civil Aeronautics Administration because they didn't have the authority to close that runway, and in the meantime our people are hysterical with fear, because of what happened in Elizabeth, fearing that the same thing could happen in Jackson Heights.

As I said, the port authority claimed they did not interfere with local legislation, and couldn't do it, even to protect the residents of the city of New York.

I have before me a letter from the Acting Administrator of the Civil Aeronautics Administration, dated November 1, 1951, in which we questioned their opposition to local legislation to control low flying over our city, and they objected to our bill No. 203—no, No. 435, dated November 6, 1947—and the proposed ordinance 365, dated January 1948.

In each of these cases the Civil Aeronautics Administration refused to cooperate with the city of New York in permitting legislation that would safeguard the rights of the people of the country.

Let me bring to your attention the fact that I happen to be the one who originally proposed the need for a buffer safety zone, which is no different from the original safety belt supposed to have been created around cities. You will note that all accidents that occur always occur within 5 miles of any runway or airport. On December 1, 1951, there was an airplane crash in Denver.

In the same short 24 hours there were six accidents involving aircraft, one of the planes making an instrument landing at Pensacola Airport, where six were killed, and another plane struck a power line or powerhouse, and the fact that it was a small plane prevented great loss of life, in that case there being nothing more serious than injuries. Some 24 hours later another plane almost made the airport in Arizona. In New York we did have an accident in the East River off runway 4–22 coming off the north of 4–22. Had the accident been reversed it would have occurred in the heart of Jackson Heights. Fortunately, the water acted as a safety belt.

Don't misunderstand for the moment, I am most considerate of those people who fly in the planes and the pilots and the girls who act as stewardesses, but I also want consideration for the people who live on the ground. It must be borne in mind that airports were built at a time when planes were small and when the number of flights were few.

The airport established at LaGuardia Field is entirely too small for its present safe operation. It has outlived its original purpose. It is entirely too small. Similarly, runways in LaGuardia Field are from 4,700 to the longest one of 5,600 feet. Recently, one of the men who is well informed in the field of aviation said they should never use an air strip of less than 7,000 feet, and these planes have a habit of going only 4,700 feet to get across Jackson Heights. That creates a serious situation, and when it is an instrument landing and during the summer they come so close to the apartments that the television aerials are bent.

I want to emphasize the fact that one of the most important things needed for our airports in congested areas is a buffer safety zone. We have been checking airports, and we went to Newark and over on Long Island at the airports there and as far as Bridgeport, Conn. I don't know if there are any representatives of the area here, but I am going to suggest a particular spot for a safety zone: it being the ocean on one side and I note there is very little housing in this direction toward Suffolk County. The Suffolk County Airport is a perfect spot for the city of New York to use as an airport.

My people are very serious about this situation. We realize that flying is here to stay, but we must look to the future and we can only do that by finding some solution for the present. There are others here who will be glad to give you other facts—some that I may have missed. However, I want to say that the most important thing that you gentlemen must consider is the necessity for buffer safety zones, and if they have not been within your contemplation, I feel that they should be because lives are more important than money, if we consider that buffer zones will cost a lot of money.

Mr. CARLYLE. I have been very much impressed by the statement you made relative to the houses so close to this particular runway. I got the impression that some of the homes were within just a few yards of the runway; is that correct?

Mr. MOSER. I would say, starting with Grand Central Parkway, there are houses within 75 to 100 feet of the runway and planes must come in 50 to 75 feet and lower as they approach the runway.

Mr. CARLYLE. Mr. Moser, these homes, were they there at the time that the airport was constructed?

Mr. MOSER. Yes; even before the airport was constructed over 200,000 people resided in Jackson Heights and every lot was occupied by a large apartment house. As I said before, the danger from airplanes possibly crashing in that heavily congested areas is not only imminent, but the damage, in the event of such an occurrence, would be simply terrific.

Mr. BECKWORTH. Who located the airport at LaGuardia?

Mr. MOSER. Mayor LaGuardia—Mayor Fiorello LaGuardia.

Mr. BECKWORTH. And the airport was located here when?

Mr. MOSER. It was located here approximately 12 years ago. I might call your attention to the fact that at that time the airport was accommodating single-motor and two-motor planes and not the big, heavy, four-motored planes that we have today.

Mr. BECKWORTH. But they did have four-motor planes in 1939, did they not?

Mr. MOSER. They might have, but we never saw them. The moment that the four-motor jobs began coming up over Jackson Heights, and

began coming lower than the two-motor planes, we began to observe the conditions thatI have tried to describe to you.

Mr. BECKWORTH. With reference to the report that you indicated, where is that report?

Mr. MOSER. There is a representative from the borough president's committee, who, I believe, will speak to you on that. Representatives of the Civil Aeronautics Board, the Civil Aeronautics Administration, the port authority, and all the civic leaders are on that committee. There is plenty of information in that report.

Mr. BECKWORTH. You mentioned something about low-flying planes flying over the buildings has caused some of them to be seriously damaged or disintegrated. Can you tell us more about that?

Mr. MOSER. That is in the section of the report dealing with the engineering report and in which you will find that low-flying planes have injured buildings. We have made a study of the noise measurements in that area and are now making a study of physical damage to the buildings themselves, and various members of the committee are really checking up on that now. We have affidavits covering the cracking of walls and ceilings and moving of beams.

Mr. BECKWORTH. Would you assume the responsibility of seeing that the committee gets a copy of that report giving information along that line?

Mr. MOSER. I shall be very happy to.

Mr. MACK. I would like to make an observation concerning something that Mr. Moser said. Mr. Moser stated that he has information that ceilings have been cracked. I live 50 miles from any major terminal airport and I have cracks in my house which I can't associate with air transportation.

Mr. MOSER. I can answer that. I am in the real-estate business and I know that cracks appear without vibration, but you can tell a vibration crack and cracks resulting from ordinary wear and tear and settling of the building.

Where the cracks run the entire range of the wall, that's not ordinary use.

Mr. KLEIN. Did you make any recommendation that might ease the situation? Do you think the runway should be closed?

Mr. MOSER. Yes, runway 4–22 should be closed immediately and then we should try to work out a proposition as to whether LaGuardia Airfield is fit for present heavy air traffic use and to find out whether this is a proper location for an airport. Every pilot and practically every newspaper agree that LaGuardia is the most inaccessible airport in the country. It is more dangerous than any other airport because it is surrounded by these large apartment houses.

Mr. KLEIN. If we were to close that runway, then the planes would not fly over Jackson Heights?

Mr. MOSER. No, they wouldn't.

Mr. KLEIN. Would they run over any other community as close as Jackson Heights?

Mr. MOSER. No.

Mr. KLEIN. And the other runways?

Mr. MOSER. The other ones will bring them over water before they hit the houses. They will go over Flushing Bay and miss the houses, but as far as Jackson Heights is concerned, we get it immediately, within 25 feet of the runway. If they had put a safety zone—a safety

belt as I am suggesting that they do—the chances are that some 36 or 38 people would be alive today who were burned to death a few years ago at LaGuardia. I think the pilot in that case was a hero. I think rather than go into the houses, he went into a ditch. I am sure that you gentlemen will agree that a plane should have elbowroom, whether operating over water or land. We need airports, but they should be moved to places where they will not be a hazard and a danger to hundreds of thousands of people. There is no reason why property should not be razed for the purpose of locating airports in safe places, just as the city of New York moved houses and homes for the purpose of creating new housing facilities in that city.

I tell you, gentlemen, that LaGuardia Airfield is too small for the purpose it has to serve; it is inaccessible, it is dangerous, and is a menace to the people in the surrounding and adjacent congested areas.

Mr. WOLVERTON. I understood you, in describing the surroundings of LaGuardia Field, to indicate that LaGuardia Field is a difficult one to come into or go out of.

Mr. MOSER. Yes; due to the apartment house situation.

Mr. WOLVERTON. Were those apartment houses there before the field was built?

Mr. MOSER. Yes, and since then a great many new ones have been constructed.

Mr. WOLVERTON. I happened to be present the day that LaGuardia Field was opened and I flew into there from Washington and it is not my recollection that it was surrounded in any such fashion that you have described. It is my recollection that it was a rather open space across there and the wind was blowing terrifically and I think we felt at the time that we were out on an island—some place alone, and I have been there since where there was enough water around there to make one think it was an island. I don't recall anything like what you have described, existing at that time.

Mr. MOSER. Did you come in by plane or automobile?

Mr. WOLVERTON. By plane.

Mr. MOSER. If you came in over runway 4 you had to go over the apartment houses. If you came in on runway 1331, you will have come into the open waterways and lowlands, such as Rikers Island. However, runway 4 is the only instrument runway in LaGuardia and they have to use it. I came in recently from Miami Beach and during the night we had to come over runway 4 and you had to dive in to avoid hitting the apartment houses. Instead of coming in by plane, you ought to come in by automobile over thirty-fourth and seventy-sixth. Runway 4 should be stopped immediately—the use of runway 4 should be stopped immediately.

Mr. WOLVERTON. Mr. Moser, having in mind the conditions as I remember them and the conditions that exist at the present time, has there been considerable building going on?

Mr. MOSER. Tremendous. Practically every lot except the old homes has been built on. Recently there was an elimination of 115 of the homes where they are putting up a watch plant directly in the path of runway 4. I understand that 2,000 employees will be working there and you can readily understand if a plane crashed into that plant while these people were working there, what the result would be.

Mr. WOLVERTON. How do you account for the fact that so much building went on in close proximity to the airport, if the conditions are as you have described them?

Mr. MOSER. The ordinary person does not realize what the real situation is when he buys a home here. People never realize, and I am sure you will find that to be a fact if you do some inquiring on that point, what the airplanes would do to us. You must remember that we did not get these conditions until a few years later. The record will show that we had no objections to single-motor and two-motor planes at that time, but when they started to make the big ones and those big four-motor jobs started coming over our homes, 600 trips a day and more, and that meant every minute or minute and a half each day that they would be coming over; it created an entirely different problem. We were willing to take our chances during wartime on all those planes flying over our homes and creating the noise and the danger, but in peacetime I think we are entitled to insist on a change. I think the people of the adjacent congested areas are entitled to enjoy the peace and security of their homes. I feel that this problem can be solved and solved in a way that will create the least harm to everyone concerned.

Mr. WOLVERTON. Why do you think that a buffer zone or buffer belt will provide a proper ditching place for planes that are in distress?

Mr. MOSER. Let's take the last one in Elizabeth. Had there been a 5-mile safety zone, you would not have had the tragedy that you did. The pilot left at the rate of 140 miles an hour. He left the runway at 12:18 and at 12:19 reported trouble. He crashed at 12:20. In these 2 minutes he would have been 4 miles from the runway, with another mile of safety landing over land or water and would have had an opportunity to ditch his plane and probably save all the passengers or most of them. However, he attempted to make a turn and he crashed.

Mr. WOLVERTON. Then it is your recommendation that there should be a 5-mile safety zone surrounding each airport?

Mr. MOSER. Definitely. They need it now and they will certainly need it in the future, whether that safety zone is land or water, and I know that the pilots desire that type of safety zone.

Mr. CARLYLE. Your home is directly in the glide path?

Mr. MOSER. Yes.

Mr. CARLYLE. Was the glide path there when you constructed your home?

Mr. MOSER. Yes; there was a group of buildings and a big building. As a matter of fact, the field lights coming from Thirty-first Avenue did not go up until a year after we moved in.

Mr. WOLVERTON. The location of LaGuardia Field was the result of a municipal act—in other words, wasn't it done by selection of the municipal authorities?

Mr. MOSER. Yes, and with good intentions at that time, and the intentions are still good now, but unfortunately the field has become too small for the purposes that the airport was intended to serve when the municipal authorities orginally selected that as a site for an airport.

Mr. WOLVERTON. In other words, you recommend the elimination of the field entirely, if possible?

Mr. MOSER. Yes; because it has outlived its usefulness and the purpose for which it was originally intended. If jet planes—jet-propul-

sioned planes—come in, judging from what the home owners in England say, it will be simply terrible, and we want to prevent any such situation occurring.

Mr. WOLVERTON. If you carried out the present airfield limits so as to create a 5-mile buffer zone, it would be impractical because of the extensive condemnation proceedings that would have to take place and that's why you recommend removal?

Mr. MOSER. Yes. You are not going to remove churches and hospitals and apartment houses for the purpose of enlarging an airport whose facilities are inadequate for modern times. These planes can be saved and the equipment can be removed and taken to a safer place. There is no doubt but what the creation of a buffer zone as I have suggested would remove a great part of the hazard that now faces the people of Jackson Heights, but as you have stated, the condemnation proceedings at this time in order to provide such a safety belt is impractical in every sense of the word.

Mr. WOLVERTON. Do you know whether the city of New York obtained compensation before turning the airport over to the Port Authority of New York?

Mr. MOSER. I believe they did, because they never give anything away for nothing.

Mr. WOLVERTON. Thank you, sir.

Mr. BECKWORTH. The next witness will be the chairman of the Low-Flying Committee of Queens County, Mr. Harold W. Felton.

STATEMENT OF HAROLD W. FELTON, CHAIRMAN, LOW-FLYING COMMITTEE OF QUEENS COUNTY

Mr. FELTON. You gentlemen of the committee expressed interest in the field represented by that map. May I point out that although the line extends southwest—Mr. Moser's home is marked with a little circle right there, and my home is down there, where it is marked with a cross, a little farther down.

Mr. BECKWORTH. All right, Mr. Felton, you may go ahead.

Mr. FELTON. In the hope that it may resolve some of the difficulties, I may say that I bought my house in Jackson Heights in 1938, about 2 years before the airport was constructed, and at that time it was about a mile and a half from runway 4–22. At that time it was a small, built-up area of detached homes. In the first area across Grand Central Parkway, there is a group of homes which have been there 45 years. That vacant area there is now filled with a veterans' housing project.

Mr. HINSHAW. Where is that, College Point?

Mr. FELTON. No; southwest. My colleague, Mr. Moser, has already given you an extensive report, which I had intended also to cover, and so I will not take the time of the committee to go all over that ground again, but it seems to me that this whole problem resolves itself into a problem of obtaining consideration for the people who are on the ground.

We do not question the necessity for progress in the field of aviation. We have every consideration for the men who fly the planes and for the airline owners and for the people who are vested with the responsibility of operating the airfields, but you gentlemen must realize that

these fields, located next to heavily congested residential areas, owe a duty to the people who live there and make their homes there.

We ask you to consider the facts that have been placed before you in the report made to you by Mr. Moser and those who have preceded him and those who will follow me. I am sure this committee will do everything in its power to see that the people of Queens County, and particularly the people adjacent to LaGuardia Airport, are given the opportunity of living their lives in a normal manner and that you will do something to insure the removal of the terrific noise and vibration they have to undergo now and also remove the hazards of low-flying planes.

We want to thank you very much for coming here and I know that we can speak for the civic leaders in Queens and for the people in these communities, when we say that we are looking forward to recommendations and action from this committee that will be good and helpful to everyone concerned.

Mr. BECKWORTH. Mr. Felton, do many of the people in the area that you are familiar with, try to sell their property?

Mr. FELTON. There is a great deal of controversy on that point. You will find people who will tell you that the airport increases the value of their property. However, the Federal Housing Administration analyzed that and told their processors to reduce loans on places close to airports.

I may say that I paid $7,000 when I purchased my home and, when I did, I had a choice of banks and home-owner loans. Now they are selling—that is, homes are selling in that neighborhood at between eleven or twelve thousand dollars, but, during all the time that we have been there, except for the first 2 years, we have looked assiduously for a house to move to, a house having the same sort of facilities as the one we now own, and we find it impossible to find such a place within reason and it will cost us $8,000 to move. You can't find a house away from the airport that will cost you less than eighteen or twenty thousand dollars, and that is out of the question for us. That's the reason why we do not sell our property and move away.

Mr. BECKWORTH. What I would like you to give me an idea on is this: You say that you paid $7,000 for this house back in 1938.

Mr. FELTON. Yes.

Mr. BECKWORTH. Assume that you paid $7,000 for a house in a comparable area—let's say in a comparable area the house would be $14,000 today. Would your house be less than $14,000 because of this airport noise?

Mr. FELTON. I think undoubtedly so. No one in his right mind would move there now with the circumstances resulting from the airport, what they are.

Mr. BECKWORTH. That is one of the questions?

Mr. FELTON. Yes. There is a house two doors away from us. The people who put it up—the people who bought it originally or owned it originally put it up for sale last—June. They had a new house all ready to move into and they tried their best to sell it and were unsuccessful until finally a speculator bought it for $11,000 and he has attempted to sell it and he hasn't sold it yet.

Mr. BECKWORTH. What position are you in?

Mr. FELTON. An attorney.

Mr. BECKWORTH. I think I understood either you or your colleague, Mr. Moser, to say that it will cost $75,000 to pursue a suit alleging trespass and to cure your difficulties. Has anybody in your neighborhood undertaken to do that so far? Has there been any work along the line of a concerted effort on the part of the organizations represented here today to institute such a suit?

Mr. FELTON. The organization has been blocking that movement for quite some time. There is the feeling that too many difficulties would be encountered in instituting such a suit, from the realistic point of view. There is difficulty in getting thousands of people moving along the same line, especially if it costs money.

I have looked into the matter and have talked to counsel in New York. I have talked to outstanding counsel in New York—and that started about 2 years ago, and they advised us that you just don't enter into a situation of that kind unless your investigation is complete. You just can't say that there is noise and attempt to produce it in court without producing the exact sound.

Mr. BECKWORTH. You did suggest that it would involve the city government?

Mr. FELTON. Yes; and the Port of New York Authority and the Federal Government. For instance, the Civil Aeronautics Administration has said, "Mr. Felton, the navigable airspace above your building is 100 feet." The Federal Government contributes money to airports and if the sponsor of an airport comes to the Federal Government and says this is the kind of airport they want to build, the Federal Government agency says that is not in accordance with our requirements. You need more facilities for the convenience of passengers and the runways have to be made this way. In many cases the Civil Aeronautics Administration contributes Federal money to the construction of that airport and so, when private citizens want to seek redress from impositions such as exist here, not only do we have to bring in the city government, but we have to bring in the Federal agencies and the Federal Government itself.

Mr. BECKWORTH. Do you know of any protest in the past about the Civil Aeronautics Administration contributing money to airports, as you have described?

Mr. FELTON. No.

Mr. BECKWORTH. If, in the near future, the Civil Aeronautics Administration will spend considerable money in one of the airports that you are most interested in on the part of the citizens of Queens County, do you think the citizens will bring an action to protest that?

Mr. FELTON. One person can't do it. Even well-organized groups such as we have here, a group which is large and big and even wealthy, so far as associations go, can't do anything about it. I have no doubt but that the Civil Aeronautics Administration and the Civil Aeronautics Board and the port authority of New York have very good reasons for what they are doing, but most of the private individuals tell me that they would not have their house within 75 feet of the airport.

I believe this country, as a country, is devoted to the principle that the individuals have simple, decent human rights and I have never heard at any time since Magna Carta that it was necessary in this country to get permission to sleep at night in peace and comfort.

I might tell you that we had to put in an air-conditioning unit to

operate at night in order to keep the windows closed so that we could sleep at night in the hot summer months.

Mr. KLEIN. I was interested in the statement made by Mr. Moser about runway 4 running pretty close to your house.

Mr. FELTON. We are on the beam, as they say.

Mr. KLEIN. Do you feel if runway 4 were closed, that the situation would be materially improved?

Mr. FELTON. Yes; but if you seek a remedy, I don't believe that is the remedy. To me it is inescapable that these airports were originally conceived erroneously. There should have been a strip long enough for the planes to get off the ground and additional space long enough to get them away from the hazardous places.

Mr. KLEIN. You are speaking generally. Let's be specific. Do you think that the whole airport should be closed?

Mr. FELTON. Let me put it this way; I think cities and airports are incompatible.

Mr. KLEIN. That is still more or less a general statement. Specifically, with regard to LaGuardia Airport, do you think it should be closed?

Mr. FELTON. Yes.

Mr. KLEIN. I believe in the statement that you and Mr. Moser presented, you said something to the effect that the people living in Queens County should be made whole in order that they move to a place where aircraft are overhead less than 200 or more times a day.

If LaGuardia Field is not closed, you think that they should be given an opportunity to move away?

Mr. FELTON. Financially, yes.

Mr. KLEIN. Would they do it—that is, move away?

Mr. FELTON. I would. I don't know about the other people.

Mr. KLEIN. You are speaking about the association?

Mr. FELTON. Most people are emotional and like to continue living in the homes that they have made for themselves.

Mr. KLEIN. You think that the airport should be closed and the people not be moved away?

Mr. FELTON. Jackson Heights is a nice place in which to live. It is close to the city. It is the kind of community that many people like to live in and that is important to many of the people. On the whole, it is a very convenient place to live except for the airplane situation. This is not a case of a few planes coming over from time to time but a case of one coming over every 2 or 3 minutes.

Mr. KLEIN. You are talking about runway 4?

Mr. FELTON. Yes.

Mr. KLEIN. But if we close down, or if runway 4 were closed down, you think the situation for the residents of Jackson Heights would be measurably improved?

Mr. FELTON. Jackson Heights, Sunnyside, Maspeth, and Woodside all would be affected.

Mr. KLEIN. In other words, if runways were built that took the planes over the water, you would not have the complaint that you now have?

Mr. FELTON. Not so much, but even now there has been a new system of landing imposed or adopted so that runway 4–22 is least used. But, statistically, the velocity of the wind will require take-offs 7 percent of the time and in view of the fact that the radio landings are on

runway 4–22, it will involve landings in ILS about 15 percent of the time.

Mr. KLEIN. But if you eliminate runway 4–22, it would certainly relieve this, this situation in communities as close as Jackson Heights?

Mr. FELTON. Going to the west they can go 2 miles over water, but you must remember that they must go 5 miles up—they must go 5 miles to get up 500 feet.

Now, to the southwest—pardon, to the southeast, if the planes go straight on beam, they will go over the inhabitants of Flushing.

Mr. KLEIN. No further questions.

Mr. HINSHAW. I would like to ask the gentleman by whom this airport was erected.

Mr. FELTON. The city of New York.

Mr. HINSHAW. Did they own it?

Mr. FELTON. They acquired the property.

Mr. HINSHAW. In other words, they built it in the beginning?

Mr. FELTON. I don't know whether the Federal Government contributed aid toward the purchase and erection of the airport, but I do know that the city was at least the sponsor.

Mr. HINSHAW. When did the city of New York sell the airport to the New York Port Authority?

Mr. FELTON. I don't believe they sold it. I believe they leased it in 1947.

Mr. HINSHAW. Is that a Federal agency?

Mr. FELTON. No; it is an agency set up by State agreement between New Jersey and New York and also approved by the Federal Government.

Mr. HINSHAW. In other words, if you want to do something about it, you will have to go to this agency?

Mr. FELTON. When we went to the port authority they told us flatly that we would have to go to the Civil Aeronautics Board and the Civil Aeronautics Administration about low flying. You recall Mr. Moser telling you about the letter from the Civil Aeronautics Administration. Well, we did go to the port authority and they told us they had nothing to do with it and we would have to go and see the Civil Aeronautics Administration. You don't know where you stand.

Mr. HINSHAW. Of course the establishment of the airport by the city of New York, if it was to be used as an airport, it was necessary to go in and out of there.

Mr. FELTON. Yes.

Mr. HINSHAW. So, if it is to be moved, that is a function of an agency or authority other than that of the Federal Government?

Mr. FELTON. No; because that airport cannot be used without violating the navigable airspace regulation, and that is within the authority of the Civil Aeronautics Board. That is supposed to be 1,000 feet, but that is not true in Queens.

Mr. HINSHAW. That was understood when the airport was established, was it not?

Mr. FELTON. I don't think Congress understood that.

Mr. HINSHAW. I am talking about the airport itself.

Mr. FELTON. It could have been understood erroneously. However, the fact remains that the people who live there have rights that were taken away.

Mr. HINSHAW. Not by the Federal Government.

Mr. FELTON. Certainly the Government lets the airport deprive the people of their rights.

Mr. HINSHAW. My point is that the city of New York established the airport and not the Federal Government.

Mr. FELTON. I see your point, but if you can find out who will accept responsibility for the airplanes using this area for landing and taking off, then we will get somewhere.

Mr. HINSHAW. If you read the Federal Airport Act, the Federal authorities say the space may be used by the municipal agency but the Federal Government doesn't use it itself.

Mr. FELTON. I don't want to dispute the matter with you but if it would be helpful there is a section of the Civil Aeronautics Act of 1938 that provides for the establishment of airways.

Mr. HINSHAW. But that is not an airway.

Mr. FELTON. If it isn't, I don't know what else it is, when 400,000 planes come from one point out in Maspeth to a runway and all followed like bees to a hive——

Mr. HINSHAW. An airway is a place 20 miles wide. What you are talking about is an approach zone.

Mr. FELTON. Well, if there are two names——

Mr. HINSHAW. No; there is just one name.

Mr. FELTON. You can call it what you want but the courts have established what an airway is.

Mr. HINSHAW. If there is any need or desire for home rights in that airspace, you have the right with the municipal authorities of initiating a suit and the Federal Government will help. Unfortunately, the city of New York is the party that established the airport where it is.

Mr. FELTON. Yes; and unfortunately the city of New York does not take the same active interest in this situation that the officials of the village of Cedarhurst take. We can raise no interest on the part of New York City.

Mr. HINSHAW. Isn't it true that it is their prerogative to start this matter?

Mr. FELTON. Yes; and also mine. They won't do it and we can't, nor can we make them do it. I can only point out section 452, title 49, where it says:

> The Administrator—

that is of the CAA—

> is authorized and directed to designate and establish such civil airways as may be required in the public interest. The Administrator is authorized, within the limits of available air space made by Congress (1) to acquire, establish, and improve air navigation facilities wherever necessary; (2) to operate and maintain such air navigation facilities; (3) to arrange for publication of aeronautical maps and charts necessary for the safe and efficient movement of aircraft in civil air navigation, utilizing the facilities and assistance of existing agencies of the Government as far as practical, and (4) to provide necessary facilities and personnel for the regulation and protection of air traffic.

Mr. HINSHAW. You are now speaking of airports owned and operated by the United States to be operated by the Administrator. There is only one of them.

Mr. FELTON. I know. However, I have not been able to interest too many people about this. I am not going to feel too badly if I don't convince you, but I do hope to impress you with the fact that we do look to the Federal Government to help us solve this problem.

I believe it is the duty of the Federal Government to give us every assistance in eliminating this menace to the peaceful occupation of our homes.

Mr. HINSHAW. You will find all the help in that act wherever the municipalities initiate a matter.

Mr. FELTON. I don't want to be argumentative, Congressman, but I can only say again that I believe the navigable airspace must be the same as it affects all people and that it must be used for the people and not against them. I feel certain that when this committee has completed its deliberations and study of the entire problem that steps will be recommended by your committee to provide some equitable solution to our problem.

Mr. BECKWORTH. Mr. Felton, we certainly appreciate the information that you have given us. For myself, this problem of the flights per day that you have brought up is one that will receive my most careful consideration. I hope ultimately all the members working together will find some solution. This is just not something that one person or one group can accomplish. Most of the answers are of the kind that must be resolved by all the authorities and agencies concerned. I think probably each one of the groups interested can contribute something that will help toward the ultimate solution.

I thank you very much for the privilege of being here and having the people of Queens present their problems to the committee.

Mr. FELTON. And I assure you members of the committee that the people of Queens are very grateful to you for coming down and giving us an opportunity to tell our side of the story. I thank you.

Mr. BECKWORTH. We have with us Mr. Gross, assistant commissioner of the borough of Kew Gardens. I am sure he would like to make a brief statement to the committee.

STATEMENT OF MR. GROSS, ASSISTANT COMMISSIONER, BOROUGH OF KEW GARDENS

Mr. GROSS. I am very happy to be here and to have an opportunity to appear before your committee and also to extend the personal gratitude of the borough president of Queens.

Last October a low-flying-plane committee was set up in Queens under the chairmanship of the borough president. Since last October that committee has been studying the problems which the people of Queens are concerned with, that is, those who live in the area of LaGuardia and Idlewild. I would like to suggest that you avail yourself of the subcommittee report prepared on that matter, and I should also like to say that the chairman of the committee didn't know about the meeting this morning and therefore I ask that he be given an opportunity to prepare a statement for this committee.

Mr. BECKWORTH. That will be done. Thank you, Mr. Gross.

Now we have Mrs. Donahue, assistant district attorney of Queens County. No doubt she has something she would like to tell us.

STATEMENT OF MRS. DONAHUE, ASSISTANT DISTRICT ATTORNEY, QUEENS COUNTY

Mrs. DONAHUE. I would like to record my appearance as an interested observer in this hearing. There are other committees and representatives of various organizations interested in this problem

and I want to assure the committee and the representatives of these various organizations interested in the problem that the district attorney of Queens County will continue to make available to the committee all the facilities of our office, as we have been doing since the problem arose, in an effort to solve this problem in a satisfactory manner.

Mr. KLEIN. Has your office made any investigation of these matters?

Mrs. DONAHUE. We have conferred with representatives of the Civil Aeronautics Administration and the Civil Aeronautics Board, the Air Transportation Association and representatives of the various airlines, and these investigations and conferences are continuing.

Mr. KLEIN. May I suggest when you come to a final conclusion that you send us a copy of your recommendations?

Mrs. DONAHUE. I will be very happy to.

Mr. BECKWORTH. We also have with us Mr. Albert J. Bregman, spokesman of the Central Allied Civic Association. Do you wish to make a statement, Mr. Bregman?

STATEMENT OF ALBERT J. BREGMAN, REPRESENTING CENTRAL ALLIED CIVIC ASSOCIATION

Mr. BREGMAN. Mr. Chairman and members of the committee, Mr. Moser spoke to you about LaGuardia and I will take up the issue of Idlewild at the southern side of Queens.

Idlewild was erected a few years ago when our officials were cognizant of the fact that there was a great hullabaloo about LaGuardia and this thing was forced upon us. I would like to submit to the committee a map showing the field in relation to the community surrounding it.

You will notice that take-off 741 hits right into these points at 19, 22, and 25. They have to come in over the community and you will see that these runways nestle right up in the community. There is practically no distance from the end of the runway into the community. No doubt you are aware of what happened in Elizabeth, and we are aware of the fact that if those men who were flying those planes had the 5-mile zone in which to gain altitude—at least an altitude of 500 feet—the tragic accidents may not have happened. Furthermore, even having attained an altitude of 500 feet, if they have a 50-percent failure—that is if they have a 50-percent failure before reaching 300 feet, they will inevitably crash. Under the present circumstances there is no way that these pilots can fly the planes to safety.

As you know the streets outlined on that map contain schools and houses of worship, and the activities of the schools and the houses of worship have to cease when these planes come over. As a matter of fact, one little school has little tots in it who have become nervous and the children get in a panic. They are children from the kindergarten and the grade school of ages approximately to 10 years.

I would also like to point out with regard to the questions asked about buildings being put up before and after the airport was constructed. You will find that the majority of Idlewild homes were put up long prior to the airport being constructed there. As a matter of fact, there were homes to be condemned and at this time there is a part or a parcel which may be condemned which has homes, for the erection of another runway.

Also I have marked on the map certain runways which are parallel to the present runways and which will aggrevate the conditions down there.

Mr. BECKWORTH. Do you say that the runways will be parallel?

Mr. BREGMAN. Yes; they may be activated, which will only add to our woes. Every one of these hits rights into our homes and since this place was built and became filled with planes, the planes come over and it is impossible for us to sleep. You just can't do it with planes having four motors going by all the time.

Mr. BECKWORTH. Thank you very much.

We will now hear from Mr. John Rapp, president of the Queens County City Council.

STATEMENT OF JOHN RAPP, PRESIDENT, QUEENS COUNTY CITY COUNCIL

Mr. RAPP. Mr. Chairman, members of the committee, at the outset, I want to commend your committee for the promptness and the keen interest you have taken in the problem involving the conditions from the aviation standpoint in Queens County. Most of the things that I have to say have already been expressed by other speakers.

I wish to say to you as an observation that while there are no flashbulbs here, your committee is more important to the million and a half people living in Queens County than all the publicity and fanfare of the Kefauver committee. In the beginning we were looking for support from newspapers and columnists and other people, and we looked in vain, but today we know that the situation is different when we can get a body as important as your committee to come into New York City and make an investigation. I think it was Congressman Hinshaw who asked who put LaGuardia where it was and the answer was Mayor LaGuardia. However, let me point out that 10 years later the city of New York built another airport and proceeded to go through the same errors that they made when they constructed LaGuardia Airport. They put both of them in heavily congested areas. It is possible that when LaGuardia Airport was put where it is today, that they thought it was not going to be a congested area but certainly today it is a very congested area.

In trying to find out where the authority rests or who is responsible for any changes that might be necessary in order to protect the lives and health and welfare of a million and a half people, it is impossible to know whether to go to the Civil Aeronautics Administration, the Civil Aeronautics Board, or the New York Port Authority. It would take a Philadelphia lawyer to find the line of demarcation between the authority of each one of these organizations. Frankly, it makes it impossible for us to know where to turn for help. However, I am sure that this committee can get a considerable amount of information to help in guiding it in its investigation from all three of these agencies.

There is one thing, however, that I can't understand. As far as I can see, there is no one who can investigate the port authority. We have been told that the port authority is just a landlord. I am not a lawyer, but you can hold a landlord responsible for the maintenance in a proper manner of the premises that they rent out or lease. I will ask you gentlemen to look into that phase of the situation.

I might also say that about 2 weeks before the first crash occurred in Elizabeth, Mr. Collier and I had the pleasure of addressing the people of the city of Newark, and we spoke to the commissioners, and at the end of the discussion, they said, "Where is the first plane going to drop?" And, as fate would have it, three planes dropped in another nearby community. I say that it is in your hands to prevent these tragedies and if it is a question between airline finances and airline safety, I know you will take into consideration the lives and health and welfare of one million and a half people of Queens County.

Now, I think the city of New York should be an interested spectator here at this meeting today. I see the three Congressmen and the commissioner of the borough, who is a very busy man. They all have had time and interest enough to attend this meeting but the city of New York is not represented and they are the ones who built these airports, and they maintained these airports up to a few years ago. I think your committee should interview the mayor of New York and ask him for his suggestions. After all, he was put in office to protect our county as well as the other counties in Greater New York.

Now, in 1949 the grand-jury committee, following its investigation of the deplorable conditions existing in the airport areas, set up patterns that reduced complaints in Queens County 98 percent. These patterns brought the planes over the waterways and uncongested areas. To show you that they were good patterns, this plane that dropped over the water did not lose a single life, and we say to you that if those patterns were put into effect, it would be a great step toward ultimate safety in the operation of planes in this territory.

Now, the airline people object to these patterns because it is a matter of dollars and cents to them, but certainly we should not let that deter us from insisting upon those changes. There is as much sense to their objections because of the matter of finances as there would be to a taxicab company telling the commissioner of police that they are not going to take any notice of one-way streets and other safety regulations because it would cost them too much money to comply with those regulations. It is the same thing here. Airlines today seem to only take into consideration the financial return and whether or not they are going to lose money. We say whether they lose money or not, those patterns should be reinstated and I hope you gentlemen will see to it that they are reinstated and that every safety regulation that can possibly be put into effect be recommended.

To show you the hazards involved in these airports in congested areas, up to the last meeting with the commissioner, the city of New York had no foam-fire equipment to put out fires that might result from the crash of one of these planes loaded with high-octane gas. There are areas for miles that have nothing but wooden-frame houses, which are particularly susceptible to destruction by gasoline flames, but the city of New York has no foam-fire equipment for the purpose of putting out fires caused by falling planes loaded with gasoline.

Thank you very much.

Mr. CARLYLE. I practice law in North Carolina and I agree with you that it is difficult to know just where the authority of the Civil Aeronautics Board, the Civil Aeronautics Administration, or the port authority begins and ends. It would appear to be difficult to know where the authority is given to one branch and performed by another branch.

However, it does definitely appear that each of these agencies has particular authority vested in them. I notice that you mentioned it would take a Philadelphia lawyer to determine that. Now, you don't mean to say that a Philadelphia lawyer is more astute that a New York lawyer, do you, sir?

Mr. RAPP. That is just a saying. We certainly have very good lawyers in New York.

Mr. BECKWORTH. Mr. Leonard S. Collier, a member of the Queens County Grand Jury Committee, is here and I believe he would like to make a short statement.

STATEMENT OF LEONARD S. COLLIER, MEMBER, QUEENS COUNTY GRAND JURY COMMITTEE

Mr. COLLIER. Thank you, Mr. Chairman and members of the committee for the opportunity to appear before you. However, I didn't know that we were going to have that opportunity and am not prepared to make any oral statement. However, we would like to prepare a statement and we will have it in your hands within a week.

Mr. BECKWORTH. I shall be very happy to have you send us such a report.

Mr. COLLIER. I suppose you may be somewhat interested in knowing something about what the Queens County Grand Jurors Association is doing in this matter.

Back in 1946 complaints continued to come in on this low-flying situation and other hazards and this organization, which is the largest organization in the country, having over 900,000 members, we felt that we could spearhead this thing for the civic groups, and we took over that movement to attempt to eliminate the hazards of low flying.

Now, Mr. Rapp brought out a point that I wanted to cover. I made some notes, and I would like to give you a few high lights.

You were told about runway 4–22 at LaGuardia. They neglected to tell you that the city of New York is presently spending $22 million for a hospital just off the glide path of runway 4–22. Also, runway 4–22, being an instrument runway, most of the time they only use one pavement and many pilots tell me that they never are sure that they are going to bring the plane to a stop before they go into the bay. That is one of the things to be considered.

With the hospital that is being built at a cost of $22 million and which, as I have stated, is directly in the glide path of runway 4–22, that situation has been taken up with the hospital association and they tell us now it is at a point where it can't be discontinued. It is our recommendation that no instrument landings be made on that runway until we come to a conclusion as to what is going to be done and what is going to happen to the planes being assigned here from somewhere else.

There is an ideal site to which all the present facilities can be moved out as Islip. There is an airport there at the present time and it can be used as a nucleus to construct an airport having the proper glide paths and buffer zones.

Mr. BECKWORTH. Where is that located?

Mr. COLLIER. At Islip, 40 miles from New York. I have heard that contracts have been let for the use of helicopters to transport passengers from the airport to the dense parts of the city. In that case,

it would only constitute a 15- or 20-minute flight from an airport if it were located at Islip to the heart of New York City. There is an airport at Islip now known as MacArthur Airport, and the area surrounding this airport at the present time—and, incidentally, this airport was the one that was used for servicing most of the C–46 planes on the Berlin airlift. The runways there are the length of what you have at Idlewild, but they can be very easily expanded. There is not a hill within a 15-mile circle of the airport. It is the only spot that I know of that would be feasible for a large airport of this kind, with homes, most of which are in the $5,000 class and those homes are sparingly placed.

Mr. HINSHAW. Where did you say this is?

Mr. COLLIER. Islip, in Long Island. It is this side of Patchogue.

Mr. KLEIN. Is that the one that Mr. Moore mentioned when he spoke of the one in Suffolk County?

Mr. COLLIER. No; it shows here on this map. Right below that lake there, and there is nothing but scrub oak around there. It will give us an opportunity at this moment to lay out an airport in keeping with the Government's safety requirements and provide a safety area, either in the glide path or the buffer zone to be placed around it.

We are asking that no more funds be given to the Port Authority of New York for the expansion of either Idlewild or LaGuardia Airports until some conclusion is arrived at.

Also, we are going to ask the city of New York Police Department to exercise its right to inspect planes going into the airports. We are going to ask that the airplanes be inspected by a group set up by the city of New York under the supervision of the police department, because we believe that some of these planes are not operating in strict accordance with the manufacturer's specifications for those planes.

I might state a case of the C–46, in which I think the manufacturer's specifications call for a 41,000-pound load and the Civil Aeronautics Administration has approved a 48,000-pound load, and within the last few days they have dropped that to a maximum of 45,000 pounds. If we are going to have safe operation of aircraft in this or any other area, we feel that it is essential the planes should be operated in strict accordance with the manufacturer's specifications under which the particular aircraft was originally designed and built. If you permit planes to overload in the face of the manufacturer's specified limit, that is to invite disaster, and it is not only a question of equipment and money being at stake but the lives of the people of Queens County.

In that connection, we also believe a plane so operated; that is, operated within the limits prescribed by the manufacturer's design and specifications, that in case of an engine failure of a two-engine job or in the case of a two-engine failure on a four-engine job, the pilot could still keep his plane in the air. Although we are not authorities on aircraft, we have had advice from people who are, and they tell us that the C–46, under its present load condition of 45,000 pounds, in the event of a two-engine failure, that plane cannot stay in the air.

I might advise the committee that we are at present attempting to secure from the manufacturer the specifications under which the planes were built so that we can bring to the attention of the proper people any disregard that might be shown by the airlines in loading their planes beyond the limit specified by the manufacturer's design for that plane.

We are grateful for the opportunity of talking to you, and I think that you have the sincere appreciation of the people of Queens, and I am sure that this committee will take into consideration the problem facing the people of Queens and act accordingly.

Mr. KLEIN. First, Mr. Collier, I want to tell you that I am in complete sympathy with what you have said and I am in complete sympathy with the idea of the airport in Suffolk County, but don't you assume and won't you admit that you will have houses built up around the area as soon as you locate a large airport there?

Mr. COLLIER. We are suggesting that if the airport is properly designed, that is, if a sufficiently large glide path or buffer zone is created, it won't make any difference if they do build there. Furthermore, the situation can be regulated by the municipal authorities.

Mr. KLEIN. You feel that even if the municipality builds a large airport out there, that they ought to have a zone where no homes can be built?

Mr. COLLIER. Yes; or they can permit light manufacturing plants with buildings so constructed that the planes can land on top of them without doing damage—something like one-story reinforced concrete buildings for manufacturing purposes.

Mr. KLEIN. I would think, from my experience in municipal affairs, that there would be considerable pressure brought to bear to enable the families to move in and change the specifications.

Mr. COLLIER. Long Island is a territory that has vast areas for living space. Particularly in this place where you have the Atomic Energy Commission located in the area, I don't think that many people would want to move in there and make their homes there.

Mr. MACK. We have an airport in Springfield, Ill., and the latest housing development has been proposed immediately adjacent to the airport, so I feel you would have some trouble along that line even if you moved the airport to MacArthur Field.

Mr. COLLIER. I should say that is within the prerogative of you gentlemen to set that area aside as a private field.

Mr. BECKWORTH. Thank you very much, Mr. Collier.

The next witness is John R. Reardon.

STATEMENT OF JOHN R. REARDON, PRESIDENT, JACKSON HEIGHTS CIVIC ASSOCIATION

Mr. REARDON. I am president of the Jackson Heights Civic Association. I live in Jackson Heights and I represent 26 organizations. As an individual, I cannot ignore the importance of the aviation industry and particularly the importance of LaGuardia Airport to the aviation field.

I can say that the activity at the airport reflects itself and seeps into the mercantile establishments and stores in that area. To be fair to both sides, there is an honest difference of opinion as to the abolition of the airport. For myself, because of its commercial importance to the progress of the aviation industry, I am of the opinion that it should not be closed but that a determined and concerted effort and immediate steps should be taken to correct the low flying in that area and to correct the noise condition and, as I understand, some of that has already been done or the steps initiated to eliminate some of these obstacles.

I am of the opinion that within the last few weeks there has been a noticeable improvement. I am in hearty accord with the cooperation going on between the port authority, the Civil Aeronautics Administration, the Civil Aeronautics Board, the various civic associations, and all the groups making up the Queens Committee on Community Aviation Problems. I think that is the proper spirit in which this entire problem should be handled. I feel that we must not get hysterical about the subject matter, but I say this is what we should do, and that is set aside temporarily the legal approach as regards the matter of the respective airports, and I can speak only about LaGuardia from experience, and go directly to the matter of low flying and noise.

I feel that if your subcommittee will study the minutes of the meeting called by the borough president covering local conditions, and I assume you will be getting a copy of those minutes, it will be most helpful to your group in arriving at a determination of the problems before us.

I believe there is an honest difference of opinion in the various sections of Queens on the question of LaGuardia Airport. My survey indicates that we are concerned largely with the life and health and safety of the majority, as well as the safety of the ships and those who use them, and I think everything humanly possible is being done to effectuate that safety.

Thank you for the opportunity of expressing my views to the committee.

Mr. HINSHAW. May I point out that this committee has already begun its study of noise and has found one means of diminishing noise and we have found out that the problem of noise can be reduced and we have been very active on that for some time.

Mr. BECKWORTH. I believe Mr. John Fuchs, treasurer of the College Point Taxpayers organization would like to say a few words.

STATEMENT OF JOHN FUCHS, TREASURER, COLLEGE POINT TAXPAYERS

Mr. FUCHS. I represent a small organization but an effective one. First of all, I want to thank this committee for coming down to hear our complaints and to try to straighten this matter out that concerns so many of the people in Queens. I am not much concerned with Idlewild, because there will be other speakers on that. I am concerned chiefly with LaGuardia Field. You have heard Mr. Moser speak, representing Jackson Heights. I am in complete sympathy with what he had to tell you. I also heard Mr. Felton, and I also am in sympathy with that, because I know the predicament that those people are in. But now we come down to the one basic point, and that is we feel that once an airliner takes off, it should go over the water or the marshlands that is adjacent to the airport and not over the congested areas where people have their homes. What happens?

Here is College Point, a community of 5,000 people. Mr. Rapp pointed out that in Queens we have a lot of small home owners and that is the organization I represent, of the small home owners. Many of our homes are within about a 2-mile radius of LaGuardia Field. The planes at the present time are taking off, I believe, on runway 27 over Flushing Bay.

I want to point out to the committee that in College Point we have all frame homes. We do have factories there, it is true, but mostly we have frame homes. What happens in the event one of these planes comes down and plows into a frame house? You know what will happen. You will have anywhere from 10 to 25 frame buildings, with people in there watching television, which would be destroyed at one time. We do not have any gasoline fire-fighting equipment and we only have two engine companies, and a hook and ladder. What would happen if one of these things ever strikes in College Point among these wooden or frame houses? The nearest fire hydrant is—I don't know what happened in Elizabeth, but we only have assistance that we can get from Flushing, which would be 3 or 4 minutes getting into College Point. We have tried to take steps to see that this condition is corrected, but when they find out we want to have LaGuardia Field closed, right away they worry about the money in New York—the money that New York is going to lose from revenue. I would rather see them lose revenue than human lives.

There was a suggestion made that the airfield should be removed to MacArthur Field on the island. I think that they do have helicopters at the present time that they can use to ferry the passengers to New York. I certainly think that they should get rid of LaGuardia Airport and move it out there.

We had a plane crash not so long ago in Flushing Creek. The reason the pilot crashed is that he came in on an instrument landing and didn't know where the end of the runway was and he crashed into the creek. It so happens that people in College Point have a disaster unit run by the people of the community.

Our community asks you to try to help us in this predicament that we are in at the present time.

Mr. BECKWORTH. Thank you.

The next witness, I believe, is Mrs. Marie Courtemanche.

STATEMENT OF MRS. MARIE COURTEMANCHE, REPRESENTING CHERRY VALLEY CIVIC ASSOCIATION

Mrs. COURTEMANCHE. I would like to say that I represent the Cherry Valley Civic Association. We live within a half-mile radius of the airport. It was dangerous in the past, but it is more dangerous now that all the planes from Newark Airport has been dumped into our path. There might have been a solution before that, but there is none now. We have dozens of schools within the radius of our property and also churches, some of them recently built. At the same time, the noise from this amount of planes coming in and going from the other field is simply terrible. It has increased rather than reduced, and that noise and danger to the lives of the people whom I represent or who my association represents is simply terrible. When the people turn television on, they might as well not have bought a television set because they can't hear anything that is going on. We also feel that the noise causes us to lose sleep.

Furthermore, the people who have been there for many years can't secure mortgages any more on their property. That is an economic loss, and we have certain rights that we must protect, and I want to say here that I think it is a most wonderful thing to have this committee come down to New York and listen to our problems. I know

that when you return to Washington you will consider what you have heard here and do everything you can to help us.

I would also like to say that I agree with Mr. Collier's suggestion and recommendation that you try to find and utilize the area at MacArthur Field because they have more space for the airport there than we have here and also because of the danger being greater here with all the buildings so close to the airport. I don't believe that this committee feels that mechanical things have taken precedence over human lives. Our country has always taken the lead in showing that human lives are placed above everything else. That is why we are fighting today in Korea, my son and others, right now. At the same time, I would like to ask Mr. Reardon, the last witness, why he thinks the airport should not be closed. Is he more interested in dollars or human lives? The lives of 1,500,000 Queens residents depend on the decision that you gentlemen make today.

I thank you on behalf of my community.

Mr. KLEIN. Where is Cherry Valley?

Mrs. COURTEMANCHE. On the outskirts of Idlewild.

Mr. KLEIN. Thank you.

Mr. BECKWORTH. We will now hear from Mr. Royal E. Dalrymple, president of the Eastern Queens Civic Council.

STATEMENT OF ROYAL E. DALRYMPLE, PRESIDENT, EASTERN QUEENS CIVIC COUNCIL

Mr. DALRYMPLE. I am happy that John Wylie, president of the New York Port Authority, is here.

It was a mistake and a tragic blunder to erect two airports in one borough—two airports representing an area of over 5,000 acres and representing a valuation which is tax-exempt of more than $75,000,000. We agree with the previous speaker that lives should come first.

I know the position that you gentlemen are in. You have been hearing nothing but safety, safety, and we endorse that position because we believe that safety must come first. When we spend hundreds of billions of dollars to create safety and peace abroad, it seems that along the same line of reasoning we ought to be willing to spend a few million dollars for safety and peace at home, especially in the Borough of Queens.

It is the people on the ground that we are concerned with, my neighbors, your neighbors, people who have spent their lives saving money to buy a little home, who have bought that home, and who have raised their families and attended the local churches and schools, who participate in the community life and welfare—it is those people that we are concerned with; and this hazardous condition has created a liability in the communities adjacent to LaGuardia Airport and Idlewild Field that cannot be ignored and that cries for action.

I believe that the Queens City Council should tell both of these airports, for the welfare of the people of the Borough of Queens, that these airports must be closed. I believe that, pending their removal from the vicinity of our homes, definite safety devices should be installed. If these safety devices are not permissible, due to the lack of American ingenuity, then the airplanes should be landing elsewhere and not here. They should not be permitted to land in the congested areas like the city of New York and like the congested

area around Idlewild and LaGuardia. We believe that it was an imposition and rank discrimination to put two airports of this size in one borough of our great city. We know since the inception of these two airports, many changes have taken place. In the beginning, perhaps, the airport was safe with the regulations surrounding them as of that date, but with planes getting larger and faster, with the proposed jet planes of the future, we must today prepare for that future.

We hear in the newspapers that the proposed plans of the port authority and the airlines, including the Civil Aeronautics Administration and the Civil Aeronautics Board, is to expand and expand. The more these airports expand, the greater the menace to the lives of the people in the Borough of Queens. The greater the expansion, the greater the fear that inculcates our youngsters today, not only during the daylight hours but at night.

Do you gentlemen know that I have heard parents say, "Mr. Dalrymple, my youngsters throw the covers over their heads at night and they clap their hands to their ears and they yell 'Mama, Mama' "? When these low-flying planes swoop down within a few feet of the rooftops, have you any idea what that experience is like, gentlemen? I have had similar experiences, and I say to you that the lives of these youngsters and the lives of the people in Queens should be safeguarded and this entire question be given your most serious consideration.

I grant you that the port authority and the other agencies have gone forward somewhat since the Elizabeth disasters and have tried to correct certain conditions, but the forward progress has not been rapid enough to meet the situation, and unless safety precautions can be initiated soon, there is only one conclusion that can be arrived at and that is the conclusion based upon the best measures for the welfare of our great county.

These two airports must be closed and moved to a less congested area so that Queens County may continue in a natural way, not only to progress and go forward, but to help its people enjoy the normal life of citizens of a great community.

I want to thank the members of this committee and, before finishing, may I say in conclusion that the Federal Housing Administration, in July of 1951, published a book of 23 pages called Analysis of Residential Properties Near Airports. The conditions in that book show beyond any reasonable doubt that airports are a liability in a residential area. I would like to quote the following:

> The members of the Eastern Queens Civic Council, recognizing that three major airplane disasters with 119 lives lost and many injured occurred within 2 months recently in Elizabeth, N. J., and the constant fear of similar disasters in Queens—the borough of homes—resolved to file applications for reductions of 50 percent in the assessed valuations for 1952–53 on or before March 15, 1952, with the tax department, Borough Hall, Kew Gardens.
>
> This program was adopted, we have been informed, following a report of a special committee of the council which reviewed an analysis of residential properties near airports by the Federal Housing Administration of July 1951, "which shows depreciation appraisal values up to 74.4 percent on account of the danger, noise, and vibration from low-flying planes in the vicinity."
>
> The courts have recognized, according to the FHA report, the hazardous and nuisance nature of airports. The legal protection afforded owners of neighborhood land from annoyance by an airport usually relies on three theories. One is that constant flights in the airspace above their land constitutes a

taking of their property; another, that the manner of operating the flights constitute a nuisance; and third, that the flight constitutes a technical trespass.

Therefore, considering the law of averages that "It will happen in Queens" and the tragic hour of sudden death from the air ahead, all property owners should be compensated in full for this forced hardship by the airport and airlines.

Furthermore, with the expansion program of the Port Authority of New York and airlines at the tax-exempt New York International and LaGuardia Airports in Queens, additional hazards and noise day and night will be afflicted on the public—the innocent victim. Equity, therefore, demands that the port authority and airlines pay in full for the special privilege of landing planes in Queens, pending the closing of these two airports for safety and the welfare of Queens.

I may say that I added in that connection that—

The people of Queens, all the people, residing under this umbrella of death should follow this 50 percent assessed valuation reduction plan while the council petitions the city to charge the airlines an equitable franchise tax to make up the difference in revenue.

Now, I don't know if you gentlemen have seen that booklet put out by the FHA. That's the only copy I have, but I will be glad to present it to the committee. Any questions, gentlemen?

Mr. BECKWORTH. If you need the book we will get a copy of it, but on the other hand, we will be glad to see it if you wish to submit it.

Mr. DALRYMPLE. I will be glad to submit it and also I would like to leave a copy of the resolution of the Eastern Queens Civic Council to the legislators and civic leaders. Suppose I read it into the record?

Mr. BECKWORTH. All right.

Mr. DALRYMPLE (reading):

The Eastern Queens Civic Council, the Central Queens Allied Civic Council, the Queens County Civic Council, the United Civic Council, the Queens County Grand Jurors Association, and many other civic groups met last night and enthusiastically endorsed two bills now pending in the State legislature, designed to protect the citizens of Queens County from improper operation of the airports in Queens by the Port Authority of New York.

The sponsors of these bills are Senator Seymour Halpern and Assemblyman Fred W. Preller. The more important of the two proposed laws provides for suits by taxpayers to enforce by injunction the compliance by the port authority with local laws, including zoning laws (Senate: Int. 1844; Print: 1956. Assembly: Int. 2160; Print: 2248).

By virtue of this new law, any taxpayer could go directly to court to prevent the port authority from carrying out such plans as those proposed by it last year, namely, to lease a drive-in theater and factory buildings at the tax-exempt New York International Airport, Idlewild, Queens.

The other bill (Senate: Int. 107; Print: 107; Assembly: Int. 60; Print: 60) provides for taxation by the city, county, and State of property of the port authority which is not used exclusively for airport purposes. This act is designed to meet the protests of Queens taxpayers that private competitive firms would otherwise enjoy tax exemption on port authority land that was bought with city funds and leased with tax exemption to the Port of New York Authority.

Royal E. Dalrymple, president of the Eastern Queens Civic Council, said, "The people of Queens are deeply grateful to Senator Halpern, Assemblyman Preller, and all of the other legislators of Queens who are fighting, through these bills and Senator Halpern's investigation bill, to protect the people of Queens. If both bills pass, we will at least have a fighting chance to prevent the kind of disaster that happened in Elizabeth, N. J., from taking place right here in Queens, the borough of homes. If we can get restraining orders from the courts whenever the Port of New York Authority tries to erect a new hazard, then, while it would be better to take the airport out of the county altogether, we would at least have a chance to stop them from making our lives even more dangerous than they are now.

Mr. BECKWORTH. I see that Mr. Ross is back again. Do you want to say anything further, Mr. Ross?

Mr. Ross. I am sure, Mr. Chairman, that you and the committee know that we have a serious problem at LaGuardia Field with the Jackson Heights, College Point, and Flushing area. In my opinion, this has resulted because LaGuardia Field has been permitted to degenerate into a slum airfield, because of several reasons and circumstances.

The committee is aware of the fact that LaGuardia was built on filled-in land. During the period of time that the city was operating LaGuardia Field the city lost money for years and it never has kept pace with modern aviation. Since it was taken over by the Port Authority of New York, there has been some controversy between the port authority and the major airlines as to the use of LaGuardia or Idlewild Fields. The runways are inadequate at LaGuardia, the landing strips have not been kept in the best repair, the facilities are inadequate and particularly so today because of the congestion since a great number of flights have been shifted from Newark Airport to LaGuardia and Idlewild.

Now, it has been suggested that Runway 4–22 be closed. The suggestion I would like to leave with the committee is this: There seems to be no final authority as to who is to enforce safety precautions at airports. I would suggest that the committee take under consideration clothing the Administrator of the Civil Aeronautics Administration with authority to establish safety regulations at airports and to enforce those regulations. Ultimately, we may have to close LaGuardia Field. I personally hope not because it has meant a great deal to the growth of the community of Jackson Heights and to the Borough of Queens.

The aviation industry is a gigantic industry and a great many of the technicians and other personnel of the airfield have their homes in Jackson Heights—thousands of them. However, if the airfield is ultimately closed—if it is determined ultimately to close LaGuardia Airport, I would suggest that in the interim there be given to the Civil Aeronautics Administration authority to enforce safety regulations and precautionary measures in order to protect the industry and the health and lives of the people of this community.

Thank you, Mr. Chairman.

Mr. Beckworth. Mr. John R. Wylie, deputy director of aviation development of the Port of New York Authority is here and will be glad to answer any questions.

STATEMENT OF JOHN R. WYLIE, DEPUTY DISTRICT AVIATION DEVELOPMENT, PORT OF NEW YORK AUTHORITY

Mr. Klein. Mr. Wylie, some reference has been made here to one or two points that I would like to have you clarify. First of all, I understand a new runway was opened at Idlewild at 0800, March 7, eastern standard time, for pilot operation under provisional flight conditions. Is that correct?

Mr. Wylie. Yes; this runway was activated pursuant to recommendations of the Queens County Association and the National Airlines Coordination Committee, in line with the adoption of the runway-use program. That runway has been opened for that purpose.

Mr. Klein. Will it be very long before it will be equipped so that it will be available for night flying?

Mr. WYLIE. We are recommending to our board of commissioners this week that the necessary work to equip that runway with permanent night-lighting equipment be rushed, and to construct the taxiway at the western end. I must say that will take some time to do, because of the difficulty in obtaining the proper material: Copper light switches, regulators, and other equipment.

In the meantime, we are trying to get some temporary lighting units, either the Army B–2 type or the condenser discharge type of units, with the idea of installing them much more quickly.

Mr. KLEIN. I am hoping to hear that your plans for getting these lights can materialize as quickly as possible. I am also happy to hear that the port authority does consult with the other agencies in the area, because in that way you may arrive at some unanimity of opinion. I know that you can't always get that, and I am happy to see that there is a strong measure of cooperation among the different agencies, committees, and organizations.

Mr. WYLIE. May I say that with the inception of the unique organization, the committee on aviation—and I say unique because it is the first time where representatives of groups having a just cause for complaint could get together and meet with agencies having the responsibility and ability to take corrective measures. This is the first time in my knowledge, in the history of aviation, that these various groups have been able to get together on an amicable basis and make constructive recommendations.

I commend to your committee the suggestion made that you review the minutes of the Queens County Committee. Therein I think you will find in the course of implementation, many of the recommendations made this morning, looking toward the solution of our mutual problems and particularly those made by Mr. Klein.

Mr. BECKWORTH. Will you see that we get a copy of those minutes, Mr. Wylie?

Mr. WYLIE. Yes, sir, I will. I will get in touch with the president of the committee and see that a copy of those minutes are furnished to the committee.

Mr. KLEIN. Mr. Wylie, I think you heard the testimony concerning runway 4–22, flying directly over Jackson Heights, a very populous area. I am impressed myself with the hazard that exists when these planes take off over Jackson Heights. Is there any plan under consideration at the present time by the Port of New York Authority of building a runway such as you have just done in Idlewild, which will obviate the necessity of using that particular runway?

Mr. WYLIE. I am sorry, sir, I know of no such plan. It would be practically impossible to do so at LaGuardia because of the nature of the terrain around LaGuardia Field. I know of no such plan, Congressman.

Mr. KLEIN. If they decide that runway should be closed, I understand there are three runways on the field, although this is the only instrument runway on the field; is that correct?

Mr. WYLIE. The prevailing wind and instrument conditions in this area require the use in a northeast direction around 7 percent of the time and in a southwesterly direction 7 percent of the time. Its use in a northeast direction is not difficult from the point of view of Jackson Heights for take-off. Conversely, its use in a southeast direction for landing has no effect on Jackson Heights.

Mr. KLEIN. My thought is this: Is it difficult to move instruments from one area to another?

Mr. WYLIE. The only difficulty is the control patterns. There are maps available which illustrate the patterns available.

Mr. KLEIN. That might save time. Now, you have heard about MacArthur Field in Islip mentioned by one or two of the witnesses here this morning. Have you any thought on that point as to relocating there?

Mr. WYLIE. We must confine our interest to a purely objective one. That is outside of our scope.

Mr. BECKWORTH. Assuming that there are three or four or five hundred planes or flights daily over a given neighborhood, is the port authority and your board of commissioners working along the lines of trying to do something about that problem as far as the citizens are concerned?

Mr. WYLIE. That is one of the very important recommendations the Queens committee deals with, in the adoption of the so-called preferential runway system, which was implemented at LaGuardia and Idlewild Airports at 0001 February 22, 1952.

I mean by implemented that with all factors working at the time, the increase of the 6- to a 15-mile-an-hour cross-wind component—under that system planes, when the wind and weather permit, take off over areas that are less congested and less populated. It is much easier to explain that with a map than to make a statement about it but I'm sure that most of the members of the committee will admit since the system has been in effect it has resulted in a considerable improvement in the area.

Mr. BECKWORTH. And, I understand, you plan to bring about more improvement?

Mr. WYLIE. Yes, sir.

Mr. BECKWORTH. You do recognize the fact that where there are so many flights taking place over a given area—and I am speaking of a heavily populated residential area—it presents a very serious problem and necessitates everyone putting his shoulder to the wheel in an attempt to arrive at a reasonable solution?

Mr. WYLIE. Yes; we thoroughly agree with you on that and that is why we have been so happy about working with this Queens committee because it provides us with the tools to work with.

Mr. BECKWORTH. Thank you, Mr. Wylie.

I believe that covers all the witnesses to come before the committee. I wish to express my personal appreciation, and I know I can speak for the members of this committee in expressing their appreciation for the very friendly and courteous manner in which you have presented your testimony and your views. You may be sure that we will study all the recommendations made here this morning and will do everything possible, in the performance of our duty, to seek a solution to the problems presented here. The members of the committee and I thank you for your kindly cooperation and for the cordial manner in which you have received us in your midst.

(Whereupon the subcommittee adjourned subject to the call of the Chair.)

AVIATION SAFETY

WEDNESDAY, MARCH 12, 1952

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE OF THE COMMITTEE ON
INTERSTATE AND FOREIGN COMMERCE,
Washington, D. C.

The subcommittee met at 2:30 p. m., pursuant to call, in room 1334 of the New House Office Building, Hon. Lindley Beckworth (chairman of the subcommittee) presiding.

Mr. BECKWORTH. The subcommittee will come to order.

As many of you know, this subcommittee has been very interested in the seriousness of some unfortunate occurrences up at the Elizabeth area, and we are very much aware of the fact that there are others who also are just as interested as we are in trying to solve the serious problems that have confronted aviation and people who are affected by it.

Soon after the closing of the airport at Newark, N. J., it is my understanding that a committee was appointed, and, of course, one of the most distinguished aviators and one of the outstanding executives of this Nation was chosen chairman of that committee.

It is our distinct pleasure to have with us as a witness this afternoon one to tell us about that which the committee has done, Capt. Eddie Rickenbacker. And if you do not mind, Captain Rickenbacker, just state to the committee here the purpose that your committee has in mind, and describe what you have tried to do as a committee.

STATEMENT OF CAPT. EDDIE RICKENBACKER, PRESIDENT OF EASTERN AIRLINES AND CHAIRMAN OF THE AIRLINES COMMITTEE, NEW YORK, N. Y.

Captain RICKENBACKER. Thank you very much, Mr. Chairman and members of the committee.

If I may, I have a statement that I would like to read, and then submit myself to any questions that any member of the committee would care to ask.

Mr. BECKWORTH. Will you proceed and read your statement, then, sir?

Captain RICKENBACKER. This is a statement by Eddie Rickenbacker, president and general manager of Eastern Airlines, as the chairman of the National Air Transport Coordinating Committee. I appear before you today, gentlemen, as chairman of the National Air Transport Coordinating Committee. This committee was formed to direct the voluntary efforts of all elements of civil aviation toward the earliest possible solution——

Mr. BECKWORTH. Captain, would you mind suspending for just a moment? The chairman of our committee, Mr. Crosser, has just come into the room, the chairman of the full Committee on Interstate and Foreign Commerce, and I am sure that you have met him a number of times.

Captain RICKENBACKER. Membership on this committee, in addition to those principals who are present, includes the Chairman of the Civil Aeronautics Board, the Civil Aeronautics Administrator, the presidents of the principal certificated air carriers, the chairman of the Port of New York Authority, and the chief executive officers of the associations of the nonscheduled air transport operators, the private and corporate aircraft owners, the aircraft manufacturers, the airport operators, and last, but not least, the Air Line Pilots Association.

To my knowledge, this is the first time in the history of the industry that all elements of our country's civil aviation have been thus united. That fact is clear evidence of the seriousness with which we view the problem which brings us before you today. That problem directly or indirectly affects millions of people, and a large proportion of the country's airborne trade and commerce, as well as the national defense activities concentrated in the metropolitan area of New York. Aspects of that problem, moreover, are intimately related with the public welfare, the economy, and the military defense of the Nation as a whole.

The prompt, constructive manner in which your committee and other Federal and State officials and bodies have undertaken an independent search for the facts has been a source of encouragement for the people affected in the airport area. Such acts have also encouraged us to believe that a sound solution, assuring adequate public safeguards, will be promptly found.

We completely accept the fact that the immediate solution to aviation's problem in the New York area, both with regard to continued operations of the remaining airports in the area, as well as at Newark, is particularly the responsibility of aviation; judgment on the reasonableness and effectiveness of the measures taken belongs to the public, and the Government, which you represent.

Our purpose in appearing here today is to make available to you additional facts for your consideration to assist you in formulating recommendations which will best serve the interests of the public, the aviation industry, and national defense. In addition, we desire to leave with your committee the results of our studies and conclusions relative to the Newark Airport, together with certain observations of a national significance.

Perhaps the best means of presenting the pertinent facts is to review with you first the events as they occurred and as we saw them.

Following the third in a singular series of accidents heretofore unheard of in the entire history of flying, which deeply and understandably aroused the residents of the area, the Newark Airport was closed by order of its operators, the Port of New York Authority. As a result of that action, one of the two major air transport terminals serving the immediate metropolitan area of New York was put out of commission, and the public air transport service in the area and throughout the Nation was as a consequence seriously affected.

Despite the fact that neither the facilities nor the operations of the airport contributed in any way to any of the three accidents, everyone concerned accepted the airport's closing in deference to the feelings of the people in the area who were the innocent victims of the accidents, and for whom we hold the deepest of sympathy. It was our unanimous opinion that your committee and other governmental bodies should have the fullest possible access to all facts for the earliest possible completion of recommendations for the reopening of the Newark Airport, with complete assurance that every possible safeguard for the public's safety was provided for.

The position in which this action left the national air transport service, and the millions of people in the metropolitan area of New York dependent on it, was chaotic, and still is to a certain degree.

In order to safeguard the public's safety, which was seriously jeopardized by the closing of the Newark Airport, and to provide the greatest amount of transport service under the conditions prevailing, the National Air Transport Committee was formed. The purpose of this committee was to combine the voluntary elements of all civil aviation toward the earliest possible solution of the emergency in the New York area, and to initiate such action in respect to other airports as could be put into effect through voluntary cooperative efforts.

The specific concern of this committee was, first, to reduce the volume of operations at LaGuardia Field resulting from the compulsory emergency transfer of all aircraft operations from the Newark Airport; second, to reduce the suddenly increased volume of air traffic over populous metropolitan areas; third, to provide through the use of temporary facilities the most adequate public air transport service possible for the metropolitan area under the emergency conditions; and fourth, to institute corrective procedures on a national basis designed to reduce the operation of aircraft over congested areas surrounding all major civil air terminals. Toward these ends, the following 10 specific steps have been taken:

(1) The military services agreed to minimize miscellaneous operations into and out of the New York area's remaining civil airports, even though there had been substantial military operations at Newark.

(2) The Air Force issued official written orders to reduce instrument operations at Mitchel Air Force Base, the only Air Force base available in this area.

(3) The Air Force also restricted Mitchel Air Force Base to essential military traffic on official written orders.

(4) Mitchel Air Force Base in addition discontinued MIT flying during instrument weather, and discontinued "round robin" training flights below 20,000 feet through the New York area, and revised their instrument procedures at Mitchel.

All four of these actions by the Air Force have been voluntary and are considered temporary expedients because of the critical situation existing in the New York area. In doing this, however, the Air Force has stressed that the continuation of such restrictions for any prolonged period of time would seriously affect the mission of the air base as well as the individual pilot proficiency required by regulation.

5. The private and corporate owners and operators of aircraft volunteered to avoid the use of LaGuardia Field and to direct their aircraft to other airports wherever possible.

6. The nonscheduled air carriers agreed not to increase their LaGuardia services.

7. The international air carriers, both Canadian as well as United States flag, agreed to transfer all operations from LaGuardia to New York International Airport, Idlewild, for the term of the emergency, even though the terminal and related facilities there, because of the unexpected moves, were far below those normally required.

Even so, this move was largely possible only through the willingness of those operators having facilities at Idlewild to make temporary room for these additional international operations.

8. The certificated domestic operators agreed to transfer schedules from LaGuardia to other airports to the fullest extent possible, and to cancel any services which could not as a matter of standard practice be absorbed at these airports.

9. Procedures were approved and their institution jointly authorized by the Civil Aeronautics Administration, the airline pilots, and all operators of aircraft, calling for the utilization of preferential runways in order to reduce the volume of air traffic normally routed over populous areas. That was expedited and helped a great deal by the general agreement and approval between the interested parties and the CAA in raising the crosswind component from 6 miles an hour to 15 miles an hour.

10. Practice operations and training flights, flight checks, and many types of operations contributing to improved pilot proficiency, were banned at LaGuardia and Idlewild, and ordered to be carried out over open areas. These actions resulted in the voluntary reduction of 226 aircraft movements daily through the LaGuardia Field alone, and substantially reduced aircraft operations over other areas in the New York region.

Before proceeding to outline the economic effects of these actions and the loss of service to the area, I would like to pause briefly to comment, if I may, on this tangible evidence of the wholehearted and selfless cooperation.

During these past 4 weeks, I have seen everyone knuckle down to meet this problem squarely in an inspiring demonstration of the ability of aviation to rise to an emergency with unified action and decision. I have seen deep and bitter differences buried because we all recognized we were facing a problem much bigger than any one interest or individual. I have seen repeated acts of selfless sacrifice by each interest making up this committee, acts costing untold hundreds of thousands of dollars which can never be retrieved. I have seen contracts worked out through long and arduous hours, and in fact years, of hard work, set aside for the emergency; and I have seen commitments made and honored, commitments that I know hurt and hurt deeply. I have seen the pilots and the pilots' organization cooperate beyond words.

Such, gentlemen, is our understanding of the real gravity of this problem. It is with a deep and humble pride that I speak of it. The consequences and costs of these actions cannot be measured in all cases. Who, for example, can measure the costs or the ultimate consequences of the restriction which the Air Force has placed on its operations, or measure the effect the closing of the Newark Airport will have on certain classified military activities? Who can measure the value of the sacrifice the nonscheduled operators and the private

and corporate operators and the scheduled airlines have made to date in their unified efforts to keep LaGuardia and Idlewild open to air commerce?

It is possible, however, to measure, in some degree, the operating costs and losses, and to measure the loss to Newark and northern New Jersey areas.

To cite one example, to provide emergency facilities at LaGuardia and Idlewild Airports alone, the New York Port Authority has already committed itself for well over one million dollars. Most of this money is involved to provide temporary facilities, temporary passenger accommodations, temporary ramp areas, and temporary housing for customs and other Federal offices, temporary maintenance facilities and others necessitated by the forced transfer of aircraft from Newark Airport. A substantial part of this money, for all practical purposes, it wasted and irretrievably lost.

In addition, construction by the New York Port Authority of extensive taxiways, ramps, and other ground installations required for the increased aircraft operation transferred from Newark, and the provision for the fullest possible use of the preferential runways system, will, it is estimated, cost an additional $2 million.

These expenditures, plus what it has cost the scheduled air carriers, both domestic and international, to move from Newark and LaGuardia to Idlewild, total up to many millions of dollars. This money represents abolute and total loss and, similarly, can never be recovered.

These expenditures by the airport operators and by the carriers do not reflect the reoccurring costs of operation or the operating losses resulting from the inability to adequately serve the people and the business in the New York metropolitan area. It does not reflect the cost to the private fliers or the corporate owners. The cost to the public is beyond accurate measuring.

It must be clear that due to the inability of the remaining airports in the area to provide adequate facilities, the volume of public air transport service must be even further limited. Air commerce, in spite of the tremendous advances which have been made, is still seasonal. The season requirement normally is first felt during the last week of April, only 6 weeks away, it is 5 weeks now, and increases through the summer; and the increase is not limited to the air carriers. Private and corporate activities and military operations reflect a similar seasonal increase. It now appears that at least 100 additional services or movements scheduled to start within 60 days, positively scheduled for April 27 when daylight savings time takes place, may have to be abandoned. Loss of these schedules will deprive some 5,000 passengers of air transport accommodations daily; will reduce the normal air transport capacity by 46,000 pounds of mail and 160,000 pounds of cargo each day into and out of the airports in the New York area. Only seven airports in the country exceed the volume of operations, persons and goods which it now appears must arbitrarily be canceled.

These examples do not in any way accurately reflect the public stake in the services dependent upon the facilities of the Newark Airport. During the year 1951, the Newark Airport handled 20.5 percent of all passengers in and out of this area, which approximates actually 1,335,000 passengers. It handled 14 percent of all of the

mail and 48 percent of all of the air cargo, and it handled 31.7 percent of all plane movements, of which 9,567 were military.

Although completely accurate statistics are not available, certainly more than 50 percent of all business handled at Newark originates in the New Jersey area. Because of the distance between Newark and LaGuardia or Idlewild, the Newark area and in fact all of New Jersey now receives virtually no air transport service. That is evidenced by the fact, on a check that I just had made reecntly, in the last couple of days, it is costing Eastern Airlines approximately $50,000 a day, or $1½ mililon a month, and it is costing American Air Lines, from figures that were made available by them, roughly $100,000 a day or roughly $3 million per month, in passenger revenue alone.

The full effect of this cannot be measured at this time, but preliminary surveys indicate that business houses, such as banks and those businesses which have come to rely on air transportation, are at a serious competitive disadvantage with those establishments more accessible to LaGuardia and/or Idlewild. Bank clearances, for example, formerly handled by banks in 1 day in the New Jersey area now take 3 days.

More detailed surveys which are now under way on this will be made available to the committee as soon as possible.

In addition, we must remember, for instance, that this particular area represents one of the highest concentrations of defense manufacturing plants in the entire country. That, of course, we all recognize as being important at this particular time, due to the international conditions.

It should certainly be clear that passengers, mail, and goods cannot as a general practice be expected to move from the Newark and northern New Jersey area through New York City to the airports at LaGuardia and Idlewild. The distance is too great and too time-consuming to be overcome by the inherent time-saving advantage of air commerce.

The facts are clear, however, that not only New Jersey but the entire metropolitan area are directly affected by the loss of the facilities provided for their service and convenience at the Newark Airport.

With regard to the broader aspects of the problem, there is the question concerning circumstances and causes which contributed to the closing of the Newark Airport. The only authority existing today which authorizes any person, agency, or organization to close an airport is vested with either the airport operator or the Civil Aeronautics Administration. This authority can be exercised only when, in the opinion of the responsible party, the airport is considered to be unsafe.

Nothing has been brought forward to date, either through sworn testimony or otherwise, which in any way indicates that the Newark Airport was or is unsafe in any respect. Yet the airport was closed. It was closed in spite of the fact that it is one of the best equipped airports in the United States, an opinion endorsed by all of the pilots who are accustomed to using the airport. It was closed in spite of an unblemished safety record extending over a period of more than 25 years, and it was closed in spite of the fact that the three accidents that occurred in the area were in no way attributable to the operation or facilities of the airport.

The reasons behind the closing of the Newark Airport are well known to the committee, but nevertheless they bear repeating here.

Since 1946 the public demand for air transportation has shown an increase from approximately 12 million passengers to 25 million passengers; from 33 million ton-miles of airmail to 98 million ton-miles; and air cargo ton-miles from 38 million to 390 million ton-miles.

While the number of aircraft required to move this volume of traffic, due to technological advances in the design and techniques of operation, has increased only 35 percent, the size and horsepower of transport aircraft and consequently the noise produced during take-offs and landings has intensified at a more rapid rate. The noise produced by our modern aircraft has been a source of real and understandable annoyance to the residents and communities which had been moving closer and closer to airports everywhere. That problem has been particularly severe in those communities lying directly in the approach or maneuvering patterns of aircraft using Newark and LaGuardia Airports, because of the high frequency of their use.

The scheduled airlines, the Port of New York Authority, and the Civil Aeronautics Administration have been very much aware of this problem, and during the past year and a half have made substantial progress in reducing the source of annoyance to inhabitants in the area.

Specifically, what has been done will be recounted in a moment.

The tragic coincidence of three major disasters in the community of Elizabeth brought to a full head a situation which has been developing in that particular area for a number of months. The confused combination of all factors resulted in the closing of the Newark Airport. These three accidents cannot be explained away, because the facts are that they have happened. It does not soften the situation in any way to recount that incidents of the type occurring in Elizabeth are most rare; that there were more than 16,000,000 landings and take-offs in the United States during the 1951 year without one fatal mishap. And the fact cannot be ignored that aircraft, like railroads and trucks and factories, make noise—noise that is disturbing to those in the immediate vicinity.

It was to eliminate the disturbing element of noise specifically that considerable effort and money were being spent at Newark Airport. These improvements had already been made or were in the process of being completed when the Newark Airport was closed.

No. 1. The Port of New York Authority had already undertaken to construct a new main runway at the Newark Airport at a cost of $10,500,000. This runway will completely avoid all of Newark and all but a very small portion of the eastern boundary of Elizabeth. Soil preparation for this runway was begun 2 years ago, and construction is scheduled for completion by November 1, 1952. The location of this runway, known as "A," and its relation to the airport's environs, is depicted on the chart that I will show later.

This runway, when completed, will replace the present runway 6–24, which has been the real and principal source of annoyance to the residents of Elizabeth.

2. The New York Port Authority recently spent $175,000 to install a new taxi strip to the end of runway 10 at Newark. This runway, which was to be used whenever weather and wind conditions permitted, together with other available runways, would have diverted some 65 percent of all air traffic away from the populous areas of Elizabeth and Newark. These runways permit approaches to be made over the

Arthur Killian marsh lands from the south and over the Kearney Meadows and nonresidential areas of Newark from the north.

3. An operational procedure was designed and was in the process of being implemented whereby all but necessary approaches from the south and a possible 52 percent of the remaining operations at Newark would have been conducted away from the residential areas of Newark and Elizabeth. This procedure was a radical departure from the long-established and time-honored operational concepts. Similar procedures are now in use at LaGuardia and Idlewild and have proved highly satisfactory. Had the most recent accident not occurred, there is absolutely no doubt in my mind or in the mind of any qualified person in the industry but that Newark would be open today.

Moreover, I feel certain that the citizens of both Elizabeth and Newark would be applauding the results of these three acts by the aviation industry. With the completion of the new main runway, all but 4 percent of all of the flights would have bypassed both cities.

The three accidents were in no way occasioned by any defect or flaw or shortcoming of the Newark Airport. Those accidents were the product of entirely separate and unrelated factors and can only be the product of the most amazing combination of improbabilities in the history of our industry. The fatal accident that occurred in December was the first in more than 25 years and literally millions of take-offs and landings at the Newark Airport. That a second accident would occur in the same area defies the mathematical skill of an electronic plane. For three accidents to occur in practically the same area represents a probability factor of such astronomical proportions as to defy our imagination.

The findings of the Civil Aeronautics Board will unquestionably establish the detailed causes. The findings of the Board will show, I am certain, that there was no similarity of pattern between these accidents, just as the findings will show that the operation of the airport had absolutely no bearing upon or relationship to the accidents.

The residents in the area of the Newark Airport understandably made no distinction between the noise and the accidents. Both elements are associated with the irrefutable fact that the airport is where it is.

The procedures which were being placed in operation at Newark Airport at the time the last accident occurred, and the construction of the new runway, would have eliminated at least 92 to 94 percent of the flights over Elizabeth and Newark. Even without the new runway, during those days when visual flight was possible to and from Newark, 76 percent of the operations over the neighboring populous areas would have been eliminated.

It is apparent, therefore, that the program already under way would have solved the problem in two stages. The first stage, establishing a system of preferential runways would have been fully activated by February 15. It would have eliminated at least 52 percent of flying over Elizabeth and Newark. The second stage, depending upon the completion of the new main runway, would have eliminated all but 4 percent of the air travel routed over those areas.

Again let me repeat that I am convinced Newark would be open and in operation today had not the last accident occurred. Were it open today, virtually all except pure instrument operation would be conducted over the marsh, water, and nonresidential areas to the north-

east and southwest of the airport; that is out of range of the populous areas involved.

Local public agitation, understandable as it is, produced the impetus to suspend operations at Newark before these procedures I have outlined here could be fully activated, and before the facilities for which funds have in fact been committed could be completed.

Despite the undisputed safety of the airport itself, and because of the particular circumstances involved, Newark Airport, in our opinion, should be limited in its operations until the new runway has been completely and fully equipped.

For these same reasons, however, if flight over these areas could be avoided pending and after completion of the new runway, and if operations at Newark could be safely and practicably restricted to the runways which would avoid these areas, then both the noise problem would be eliminated and the public safety assured. By restricting civil and military aircraft operations to the following runways, all air traffic near Elizabeth can be completely avoided, and that over Newark reduced by 92 percent:

1. Runway 10: Take-offs only to the east over Newark Bay.
2. Runway 6: Take-offs only to the north over Kearny Meadows and nonresidential Newark.
3. Runway 26: Landings only from the east over Newark Bay.
4. Runway 24: Landings only from the north over Kearny Meadows and nonresidential Newark.
5. Runway 10: Landings from the west, as a third priority, only when necessary.

The imposition of these restrictions would mean that until the main runway was completed Newark Airport, the best equipped for this purpose in the entire metropolitan area, would not be used for instrument operations; and, in addition, because of the prevailing wind conditions at this airport, normal contact operations would be reduced an additional 32 percent. Such limitations would necessitate a reduction of 50 percent in the service normally available to the public through the air terminal. It would, however, provide for the limited use of the airports' essential facilities for national defense and limited civil air operations, while eliminating the cause of the popular anxiety associated with that airport.

Obviously, the imposition of these arbitrary restrictions upon an adequately equipped and demonstrably safe airport can only be justified in view of the circumstances surrounding this specific local problem.

That this problem, in the national interest, must be solved, and solved promptly, is equally clear. The closing of an airport is not a sound solution to either the problem of noise or accidents, but certainly it eliminates the problem. I do not believe nor can I believe that it is in the interest of our national defense or economy to accept such a solution.

It is not difficult to visualize the consequences of such an act. Were it to be repeated at other major terminals throughout the Nation, if only eight—LaGuardia, Newark, Washington, Miami, Chicago, Los Angeles, San Francisco, and Oakland—if only these eight of today's 548 civil air-transport terminals of the United States were closed down, as Newark has been closed, our national air-transport

service would be immobilized immediately, and our national defense seriously affected. Unless the problem of Newark is promptly solved, that example may well be repeated again and again until the air-transport system of the United States is paralyzed and our great reservoir of reserve air strength and air bases is rendered impotent to meet the emergencies which face our Nation, and in this most critical period in the world's history.

I might add there, gentlemen, that unfortunately, after the third accident, the communistic element in the New Jersey area took advantage of honest emotions and honest people's feeling to the extent that they were able to or did produce a leaflet of that size [indicating], and had the audacity to sign it "Issued by the New Jersey Communist Party, 252 Maple Street, Newark, N. J."; and, if your indulgence will permit, I will read it to you. The title of it is "Stop Murder From the Skies." [Reading:]

For the third time in less than 2 months—

and, now, there were hundred of thousands of these spread around that general area—

For the third time in less than 2 months, terror from the skies has struck the people of Elizabeth. More than 115 human lives have been snuffed out in the three airline crashes since December 16. Children have been among the victims. Families go to sleep at night in fear of their very lives. Why?

Federal authorities are investigating the engine failures in the three individual planes that crashed. That is all well and good. But the real cause of this terrible menace to human life is known. The cold facts cannot be hidden by the amount of statements from Eddie Rickenbacker and his airline corporation crowd. The facts show that not a single life would have been lost in Elizabeth if the airport had been closed and rebuilt far away from the populous city area; that the people of Elizabeth and this section of Newark have been demanding the closing of the airport since last summer; and that the New York Port Authority, the State government, and the Army Air Force, and the Civil Aeronautics Board, have refused to order the relocation of the airport because it would cut into company profits.

Now, tragedy has struck again, and now the airport has been temporarily closed.

When the Long Island Railroad and the Pennsylvania Railroad Woodbridge disasters took place, the engineers who ran the trains were indicted; while the corporation heads, whose profit greed was really responsible for criminal negligence, went scot free. When the Cohelwar exploded in the South Amboy disaster, the munitions corporations and the War Department never paid a cent of reparations to the bereaved families.

The people of Elizabeth and Newark want no such whitewashes. Justice demands the indictment and prosecution of the corporation heads and the port-authority officials responsible for these mass murders. Above all, the airport must stay closed indefinitely, regardless of the influence and profits of the aviation companies. Public hearings on the air disasters are beginning this week. The people of Elizabeth and Newark, through these hearings and other mass meetings can compel the State and Federal authorities to act and protect human life:

(1) Close Newark Airport and keep it closed.

(2) Indict and prosecute the airline corporation heads and the port-authority officials responsible for the crashes.

(3) Make the State and Federal Governments, together with the airline companies, pay full reparations to the families of the victims.

Human life comes before profits.

Issued by—

As I stated before—

the Communist League of New Jersey.

There were untold leaflets of that size circulated throughout the area.

Newark Airport must go. Flaming death has struck at Elizabeth residents twice in 38 days. New York Port Authority places profits over human lives. They are awarding contracts to enlarge its facilities to attract more traffic. How many more must die?

Whitewashing investigation boards will continue to investigate, not act. How many more must die?

Governor Driscoll refuses to act. How many more must die?

Does your family wake up horrified at the sound of an airplane motor closely overhead? If we love our children, we must act now. Get your neighbors to join you. Write, wire, petition Governor Driscoll, and send it to Smith & Hendrickson and Congressman Case to act now. Close Newark Airport.

Issued by the Communist Party of Union County, 252 Maple Street, Newark, N. J.

Furthermore, immediately after the third unfortunate accident, the Daily Worker, in their national edition—and it has been continuing—have had a very definite propaganda program to the effect nationally that it has been stimulated in Miami and Chicago, and in Los Angeles and St. Louis, and several other places, by the communistic element. It is very evident, in our opinion, if the Communists of this country could close a half a dozen or a dozen or 25 of the major airports in the major cities and productive centers and financial centers of this country, that the Kremlin would gladly supply them with life pensions and gold medals.

It is quite evident that they are well aware of the deadly effect on our economy, because our economy today is keyed into air transportation. Our rearmament program is definitely keyed in, and it would be a terrific slow-up if the major airports could be closed. That is to say nothing of the importance, and they know it, of keeping these airports open and developing and improving them, and equipping them with the proper aids and facilities so that, if and when the time comes that an emergency arises, they will be available for instant use by the military for interception and fighter protection, which is vitally essential.

I could not help but remember an experience that I had in Russia in the spring of 1943, during the heat of World War II, when I visited there for Secretary of War Stimson on a confidential mission, and it was evident to me after a few days, a few days after I arrived, that there was a good reason why the Germans were not trying to bomb and did not bomb Moscow proper or its environs. But they were bombing 200 and 300 and 500 miles behind, and both east and west. Naturally, my curiosity was aroused, and I was able to secure permission to see the defenses of Moscow. I was again very fortunate, when I met the head of those defenses, to find that he was a Russian pilot that had acted as copilot on the flight from Moscow to California some years ago, nonstop. I had been fortunate enough to have the privilege of entertaining that crew on their visit in New York on their return to Russia. He recognized me instantly, and it was a fortunate meeting, because there was nothing that I asked for that I wasn't shown or told.

I asked some very pertinent questions, as you can appreciate. I visited three of these airports. Mind you, the chart showed three circles of fighter airports around the city of Moscow. Two of them were in the very heart of the city, practically. At all three of these airports, a squadron at that time consisting of 15 active airplanes and

pilots, fighters, there was an echelon of five on the main runway with engines running, and pilots in the cockpit, and tied in with the telephone system as well as the radio system. That was done 24 hours per day, 2-hour tricks.

Behind them was a second echelon of five, with the pilots sitting in the cockpits, tied in with radio and telephone, and the engines were being warmed every 30 minutes. They were on a 4-hour trick.

Behind them was the third echelon, where the plane was standing on alert, and the pilots were in a tent next to it.

I asked this commanding officer about his communications system, after he had shown me the maps and the charts of these three circles of airports, and whether or not he could show me or asked the question how long it took to get these airplanes into the air after being alerted. He says, "I will show you," and we went down into the underground, into the communications center, and with a curt order he said, "Time it with your watch," and I did. And he turned around and he said, "Come." We walked outside, and in exactly 55 seconds I counted well over 100 airplanes, and they were from 1,000 to 2,000 feet overhead, that had been alerted.

I said, "How long does it take to get all of the fighter groups into the air from all of the airports?" That was the protection for the city. He said, "A maximum of 3 minutes is allowed; otherwise, I am a victim."

He gave me the impression that they recognized the value and importance of those airports to the extent that they impressed the Germans to the degree that they recognized it was useless for them to attempt to bomb it, because they would never get to it or near it with this tremendous protection.

I asked him about the antiaircraft protection. We spent a whole afternoon visiting batteries, dozens of batteries of 50-caliber machine guns, of Bufors guns, and of 90-millimeter antiaircraft guns. In fact, it was so honeycombed, the fringes of Moscow, that it represented a porcupine; that was the nearest thing I could liken it to.

All of which, again, ties back into the efforts made by these people representing the Communist Party, who understand the value to the Kremlin, to a common enemy, in case of a national emergency, to have these major airports locked up and closed, because they would be useless for the military, who would have to act as protection and use them in case of being bombed.

So that I say, with all of the sympathy of my heart that I feel for these unfortunate people who have been killed, both on the ground and in the planes, in these three accidents, it is a small item by comparison or a small loss of life by comparison with what a catastrophe it would become if the metropolitan area or the Jersey area suddenly found themselves attacked from the skies above; and that is possible now. With atomic weapons, it may mean hundreds of thousands killed or even millions, gentlemen. We know that to be a fact.

For that reason, I repeat, I am interested primarily not, as I say, in making profits. I have offered my life to my country on several occasions. I have believed in America. I believe in it to the extent that I have been willing to sacrifice my life for it on many occasions; and, to me, the protection and welfare of my homeland and its peoples is more important, many times more important, than any dollars involved, losses or profits, that I might make as chief executive of

Eastern Airlines, or—and I think I speak the minds of the members of this industry when I say they feel the same way today.

Now, I have two charts that I would like to detail for just a moment, and then I am at your mercy, pertinent or impertinent.

I do not know whether you can see this chart clearly or not, gentlemen. I will try and point it out.

At the moment, this is the instrument runway, and you will note its approach and takeoff is directly over the center of Elizabeth.

Mr. KLEIN. Is that the 6–24 runway?

Captain RICKENBACKER. Yes; that is the runway 6–24.

This is the new runway as it is being developed and has been worked on for the past 2 years, which is 7,700 feet, or something to that effect, and it can be made 9,000 or better. The approach comes down across over this lower edge, which is the industrial center or the industrial fringe of Elizabeth; and, by actual count, the average transport plane can cross over that in exactly 20 seconds. So that there is very little hazard connected with it. That parallels the new turnpike, as you remember, that was recently opened.

If you remember, I stated, by restricting civil and military aircraft operations to the following runways, all air traffic over Elizabeth can be completely avoided, and that over Newark reduced by 92 percent; that is, first, by using runway No. 10 for take-offs only to the east, over Newark Bay. Runway 10 is this one here [indicating]. That would be taking off in this direction over the boy.

2. Runway 6: Take-offs only to the north over Kearney Meadows and nonresidential Newark. No. 2 is this checkered runway, and it is taking off in that direction [indicating].

No. 3 is runway No. 28, landings only from the east over Newark Bay. That would be coming in on No. 10 in this direction here.

No. 4, runway 24: Landings only from the north over Kearney Meadows and nonresidential Newark. That is coming in this direction, or landing in this direction, over the meadows here and the bay, and taking off in that direction, in which there is no residential area [indicating].

No. 5 is runway 10, landings from the west as a third priority only, and in emergencies when necessary. That is coming in over this area [indicating], most of which is industrial here and open, and landing this way [indicating]. At the present, the airport is still, in my opinion, one of the safest in the United States, and as safe as any; and, in fact, I have always considered it as the safest, because we have been operating in and out of there for over 22 years without as much as denting a fender or injuring anyone.

Now, there is another chart that I would like to show you. There may be some questions later on that particular chart, and we can go into that.

This shows the general area, the location of Newark here. It is separated, of course, by the river. Here is the LaGuardia Airport over here [indicating]; and down here is Idlewild [indicating], Idlewild International Airport.

Now, it is evident that these airports cannot serve this large area in Jersey. It is quite evident that this vast area cannot be served by these airports. It cannot be reversed the other way; that is, because of the great element of time involved in getting to that section in this direction, or that section in that direction [indicating].

We believe that the solution is to open it with limited operations on the basis of the facts presented, which can be verified in actual practice because of the accomplishments since the 11th day of February at LaGuardia, which are, frankly, surprisingly satisfactory to all of us involved—much better than we had hoped; but it has taken the unified effort of every department of civil aviation and every company interested, and the hearty cooperation of all of the pilots involved.

Gentleman, that completes my direct statement.

Mr. HINSHAW. Captain Rickenbacker, I assume you are well aware of the fact that, among other agencies of the Federal Government, this committee took no action to recommend the closing of the Newark Airport at the time of the third accident. As a matter of fact, the committee was then preparing to hold hearings in Elizabeth, N. J., in connection with the second accident that occurred there.

At the same time, it must be recognized, I believe, that this committee has no authority to order an airport opened or closed.

Did I gather that it was your thought that we should make such a recommendation?

Captain RICKENBACKER. No. It is our purpose—and we recognize your statement to be a fact—to present to you and make accessible to you members of this subcommittee all of the facts and all of the experience and knowledge that we have available or accumulated, in order that you may in turn formulate just, reasonable, and intelligent recommendations, if there are to be any made.

Mr. HINSHAW. That, we appreciate.

Now, in connection with this first map which you showed us, there are certain curved lines on that map which I assume to be flight paths that have been agreed upon by various agencies connected with your committee; is that correct?

Captain RICKENBACKER. No; it is not, to the degree that you state. We have not the pattern in detail worked out on this map.

Mr. HINSHAW. What are those curved lines supposed to represent?

Captain RICKENBACKER. Well, frankly, they cover certain areas that could have been and were used at times, but not always. There are ways of getting to and from this particular runway to avoid or minimize the flying over any populous areas.

Coming in from the other areas, of course, we have not the detail on that. We could furnish that, I believe, without any trouble. If you wish it, we will be glad to furnish that.

I think members of our committee are here that might be able to give you more detail on that, if you wished it at this moment, or we would be able to furnish you maps and sketches to that effect.

Mr. HINSHAW. Well, the committee has understood from previous information brought to its attention that the operation of the several airports in the Port of New York Authority's area takes place on a coordinated basis in respect to directions of landing and take-off during weather conditions.

Captain RICKENBACKER. That is true, Mr. Hinshaw, because there is an overlapping of the air pattern between, as I remember—and I may be wrong in some detail—but there is an overlapping of the air pattern of Floyd Bennett Military Field and Idlewild, and that there is some overlapping between LaGuardia and Newark, but there is relatively little.

Mr. HINSHAW. Is it possible to work out such patterns in such a way as to avoid confusion or conflict in this proposed means of handling traffic at the Newark Airport which you have described to us?

Captain RICKENBACKER. In our opinion; yes, sir. The experts, our chief pilots and their operations people, are naturally more familiar in detail with it than I am.

Mr. HINSHAW. Did I understand you to say that in the proposed traffic pattern that would be established at the Newark Airport, the airport would not be used under instrument conditions?

Captain RICKENBACKER. That is correct, sir, until such time as runway A, which is the major instrument runway, is completed.

Am I correct in that statement? I think I am.

Mr. HINSHAW. What would that do to schedules that are due to be landed at airports when, let us say, a person in Miami or San Francisco purchased a ticket to Newark, and arrived finding out that instrument conditions prevented his landing? Would he then be landed at Idlewild?

Captain RICKENBACKER. Idlewild or LaGuardia. However, if such a condition existed, and if there was any possibility of instrumention being necessary by the time of arrival, say, from some distant point, they would automatically be routed into another airport in advance, and people would be advised accordingly.

Mr. HINSHAW. Perhaps my reason for asking that question may sound a little silly, because I live in the Los Angeles area where there are two airports, and I, of course, have been bussed from one to the other, having parked my car at Mines Field, and to be bussed back to Burbank, and then landed at Burbank and bussed back to Mines Field in order to get my car and go home.

Captain RICKENBACKER. That has happened to us, sir, on occasion, but not as often in the metropolitan area as it has happened in the Burbank-Mines Field area.

Mr. HINSHAW. I hope not, because I have had quite a few experiences that way.

Captain RICKENBACKER. We have much better weather in the metropolitan area, with all due respect to my California friend, and you, sir.

Mr. HINSHAW. At least it is expected in the New York area, and it is always "unusual" in California.

My reason, again, goes to the point where persons who are intending to meet incoming passengers would go to a given airport, and then find that the passengers were not to be landed there but at some more remote point from them. I presume that it would be necessary to tell all of the people in that area not to attempt to meet aircraft, is that correct?

Captain RICKENBACKER. Not correct, sir. We have that happen now. When we know that we are going to go into some other airport, and people would rather get to their destination generally than to their detailed destination, under those circumstances we send a wire or permit them to send a wire in advance and notify them sufficiently far in advance to be able to wire or telephone that they are going to land at LaGuardia or Idlewild. There have been times when that has not been possible because the weather has changed en route.

Mr. HINSHAW. Approximately 30 percent, would you say, of the landings would, in all probability, take place elsewhere than in Newark? What percentage was it that you said it would be?

Captain RICKENBACKER. We were cutting down, with the present set-up, and we would cut back to approximately 32 percent less than what existed prior to the closing of the airport.

Mr. HINSHAW. That is regular schedules, is that correct?

Captain RICKENBACKER. That is regular schedules, and I am speaking now of regularly scheduled operations.

Mr. HINSHAW. Has any estimate been made of the possible or probable diversion of aircraft scheduled to land at Newark, to other airports?

Captain RICKENBACKER. Has there been any estimate made of it, you say?

Mr. HINSHAW. Of the probable instrument weather time in the Newark area.

Captain RICKENBACKER. Yes; we can give you those figures.

In case of operation into Newark and the diversion in instrument conditions, we can give you that. We are today operating at LaGuardia because under the stress and strain, as I understand it, less operations and average movements than we had in 1949. Am I correct in that?

I say we are operating into LaGuardia less operations than we were operating in there in 1949.

Mr. FRED M. GLASS (Port of New York Authority). That is correct.

Captain RICKENBACKER. That was 520, as I remember the figure, at that time in the wintertime, as against around 480 now.

Mr. HINSHAW. Obviously there is a question whether or not weather may be considered instrument weather or visual flight rules flight weather, and that is established by the rule of what is visual flight rules, is it not?

Captain RICKENBACKER. By the rules and regulations of the Weather Bureau and the CAA, and our own operational rules.

Mr. HINSHAW. What are the proposed minimums for this operation?

Captain RICKENBACKER. What are they?

Mr. HINSHAW. Yes.

Captain RICKENBACKER. I do not think that there is any great problem in minimums. We have been operating in and out of there on instruments for the last 2½ years, roughly, with a 200-foot ceiling and a half a mile on take-offs. That is on instrumentation. What the visual landings would be, I would say offhand that a 500-foot ceiling would be all that would be necessary, at the most.

Mr. HINSHAW. Of course, only one of these accidents, as I understand it, happened under instrument weather conditions.

Captain RICKENBACKER. The other two were broad daylight or broad moonlight.

Mr. HINSHAW. Whether or not it would have happened under any other conditions, no one can tell. But instrument weather may or may not have affected the one.

Captain RICKENBACKER. It may have affected one, but I do not think anybody knows yet what caused them. Apparently, from what little we know about it—and, of course, everybody is working just as hard as they can to find out—but it might have been a mechanical failure that had nothing to do with instruments or weather or anything else. That is, as the first one was mechanical and as the third one was mechanical. Whether or not we find out the facts, I do not know.

Mr. HINSHAW. As you have GCA equipment located at Newark Airport, I would assume that for some purposes that GCA equipment might be moved to another runway and take up a part of the instrument weather; could that be true?

Captain RICKENBACKER. That is correct, and you could add that.

Mr. HINSHAW. It is a mobile unit.

Captain RICKENBACKER. And you could add mobile marker units. I would rather have the experts on that state their answer to that. I do not know whether we have any here.

Is there anybody here present who can give that?

Mr. GLASS. That is entirely a CAA question.

Captain RICKENBACKER. Is there anybody here from the CAA?

That would be entirely up to the experts of the CAA, primarily.

Mr. HINSHAW. One final question. As the military is involved in the subject of this airport for reasons well known to all of us, has the military agreed to this program that you have outlined?

Captain RICKENBACKER. That I could not answer, sir. I believe they would, but I could not answer you whether they would positively, because of the problem they have today of being forced to assemble and disassemble at Floyd Bennett, and then barge all of the way over to the dock that is adjacent to the Newark Airport. They have been using that for years.

Mr. KLEIN. Mr. Rickenbacker, is there not a safety factor involved in the continued closing of the Newark Airport? By that I mean, let us say, that some unforeseen event takes place in the plane which necessitates a forced landing in that Newark area. Do you think the fact the airport is closed, and that that plane would have to go to La-Guardia or some other place, might affect the safety of the people in that plane?

Captain RICKENBACKER. I would say positively, because it is a known fact that Newark was always the pilot's bulwark in the East; if they happened to get caught with weather, they always felt that they were safe because of the safe approach and facilities at Newark, instrumentation. That, I think, the pilots would tell you frankly in the same language.

Mr. KLEIN. Could a plane make a forced landing at the present time with the airport closed as it is?

Captain RICKENBACKER. Oh, yes. We opened it the other day, or rather, a little Cub did who got lost, and he was probably the most surprised man, and he did not know just exactly where he was. And, of course, all he found was a watchman.

Mr. KLEIN. Did they have the control tower or the CAA people out there, or is it in operation today?

Captain RICKENBACKER. Not to my knowledge.

Mr. GLASS. There is just one man there.

Mr. KLEIN. In other words, if they made a forced landing——

Captain RICKENBACKER. Mr. Glass tells me there is a standby man.

Mr. KLEIN. If they had to make a forced landing, would there be anybody in the control tower to tell anyone how to get in, or would he use it as he would any open space?

Captain RICKENBACKER. From what I know, there would not be anyone there.

Mr. O'HARA. Captain Rickenbacker, you might think some of these people sitting up here are from the Civil War, but Mr. Hinshaw and I were associated distantly with you in World War I, and——

Captain RICKENBACKER. I did not know there were any more retreads or half-tracks like me around.

Mr. O'HARA. I was sitting here, and I wanted to pay you a compliment; and if I looked as young as you do, I would be very happy with the way the years have treated me.

Captain RICKENBACKER. Thank you kindly.

Mr. O'HARA. Captain, is it your recommendation that Newark Airport be opened to a limited extent up to that point at which the new construction of the new runway is completed? Is that your recommendation?

Captain RICKENBACKER. That is my honest opinion, that it should be done, and done now, or within reason as soon as possible, for the benefit of all concerned, economically and in the interest of national defense, and so on.

Mr. O'HARA. Would you be able to state when the Newark Airport was in operation there were occasions when Idlewild, LaGuardia, and Newark, of those Newark was the only airport open?

Captain RICKENBACKER. There were many times that Newark was much better—I would put it another way: That Newark was open a greater percentage of the time than LaGuardia. I do not have the facts on it, but I do have that from experience; and I haven't the facts on Idlewild.

Mr. O'HARA. I am just speaking generally, Captain, and I did not want any specific answer on it. There would be no question but what the construction of this runway A would be a tremendous relief to the entire problem that confronts the conditions surrounding Newark Airport, is that not true?

Captain RICKENBACKER. That is correct, and was the basic reason for its conception and the start of its construction 2 years ago or better.

Mr. O'HARA. And under the plan which you have suggested, and which I will not refer to in detail except in a general way, the completion of the construction of runway A would largely relieve the traffic which might be routed or which would ordinarily have used runway 6–24? I mean from a viewpoint of direction, it would generally parallel that?

Captain RICKENBACKER. Practically so. We have proven by the increase in the crosswind component of landing from 6 to 15 miles per hour that you could say that it was as good and better, as far as directionel approach is concerned.

Mr. O'HARA. And from the viewpoint of clearing the way, the flight path would be much better from the viewpoint of the residents of those two cities?

Captain RICKENBACKER. It would be much better, and in fact, it could be as near perfect as any that I know of within the United States, or any of the major airports today.

Mr. O'HARA. While it is true that we are thinking of the use of that airport as an aid to civil aviation, it is actually as tremendously important from the viewpoint of national defense as any other airport in this country, is that not true?

Captain RICKENBACKER. More so, in my opinion, because of the tremendous concentration of industry and particularly national defense industry in the general area, in Jersey, and the tremendous population involved in the entire metropolitan area.

In other words, in case of national defense or for national defense, you would not only need that one and what you have in addition, but maybe a few others.

Mr. O'HARA. That is all, Mr. Chairman.

Mr. CARLYLE. Captain Rickenbacker, this committee conducted hearings this past Monday in New York City, and there we heard several important witnesses testify to the effect that Idlewild and LaGuardia airports should be closed. These persons told this committee that the day had arrived when busy airports like those should be removed to areas where the population is not as large as it is in that particular area.

Now, from what I understand you to say, you do not follow that thought at all.

Captain RICKENBACKER. I do not, sir. A city without an airport in close proximity to its center is as far out of date as a city without a railroad, and you have some of those in the United States today. They are still the old city square. The economy of the country demands it, and the national defense insists upon it. They are tied and interlocked in a way that if we are going to move forward or if a community is going to continue it must have transportation, air transportation, in close proximity to its activity center, because the businessman, and the manufacturers, merchants, the hotel people and the bankers who employ and are the employers of the populace in that area have got to use it as a matter of competition and self-protection. It could well bring about unemployment. It has already brought about unemployment of probably several thousand people directly and indirectly who were affected by the closing of it.

In our own particular case we have a good many hundred employees living over there, outstanding men who have been with the company as high as 22 years, and we have the difficult problem and have had since the 11th of February, of transporting those people back and forth from Newark to LaGuardia or to Idlewild, whichever happens to be the type of equipment that they are accustomed to servicing and maintaining. We have lost some employees in spite of the fact we paid the transportation. They do not want to travel. You cannot blame them too much. They start out with a 12-hour shift in order to give them an hour and a half and some of them it took 2 hours to get to Idlewild. Then it took 2 hours to get home again, depending upon the hour and the traffic. That is not conducive to happy morale or happy family life, particularly when they have been accustomed to working 8 hours a day and being home in a matter of 15 or 20 minutes at the most.

Mr. CARLYLE. So you are taking the position that the more densely populated an area is, the more demand there is for an airport in that immediate locality.

Captain RICKENBACKER. That is a "must" if that populace or community is going to maintain its position in competition with other communities of equal size in the country, as a whole, and in many cases now it becomes an international and a very positive international problem, economic problem, without convenience and comfort to the

international passenger, which is growing more important by the day. We would suffer more proportionately on that because no one wishes to go to a country that is going to have facilities that are not in keeping with what they are accustomed to and what they think they ought to have, and where the time element is a factor plus the cost in getting to and from their activities.

Mr. CARLYLE. How far do you think that an airport can be removed from an important city and yet serve the needs of that city?

Captain RICKENBACKER. That depends on the individual community, Mr. Congressman, and I would have to look at the approaches and the obstacles and look at the terrain in order to answer that. There are no two alike.

Mr. CARLYLE. That is all.

Mr. MACK. Captain Rickenbacker, I have heard that your committee has established this system of runway priority and it is very commendable, and I am wondering if your committee has considered the traffic patterns in general around the principal air terminals.

Captain RICKENBACKER. That automatically goes with it. The preferential runways are considered, and that also has to be considered. You mean the air pattern around the airport?

Mr. MACK. Yes.

Captain RICKENBACKER. Yes.

Mr. MACK. Now, this problem is not particularly associated exclusively with the New York area, but we are considering any steps or any laws that should be passed to effect safer air transportation over the country, and it has entered my mind that it might be necessary to have special patterns around most of the big airports throughout the country.

Captain RICKENBACKER. That has been the policy, Congressman Mack, coordinated between the CAA, who is the leader in the activities supported by the chief pilots and the operations personnel of the certificated air carriers. That is all I can speak for as far as that end is concerned, but they have always, and will continue, and those patterns change from time to time.

Mr. MACK. If they had a definite pattern around each air terminal it would involve the air transports staying in the air for a longer period of time?

Captain RICKENBACKER. That depends upon the community. Again you may have a condition as you have at Floyd Bennett and Idlewild that there is an overlapping of the pattern. They have to be coordinated, and there we work with the military and coordinate the two.

Mr. MACK. There would be additional expense incurred by these traffic patterns, though, due to the fact——

Captain RICKENBACKER. You could incur or you could reduce some. Well, let me put it this way: There is no pattern decided upon that is not first safe. That is No. 1. After safety comes the natural time element which is involved in economy and whatever you may wish to call it. And again there are no two alike because of the obstacles, of the terrain, and of the layout of the community. Do I answer your question?

Mr. MACK. Yes; I think that that is getting around to it. Take out the principal problem. I am interested in it generally because I believe it will avoid collisions in the traffic area.

There is one other question I would like to ask you about, and that is a single runway operation, and as you know, the Air Force operated all through World War II with a single runway, in most instances, and in that line I would like to ask you what you think the maximum component for safe operation would be, approximately.

Captain RICKENBACKER. I think, Congressman Mack, for commercial operations, and from experience that I would not want to go much beyond the 15 miles an hour, because there is a vast difference. The military has heavy wing loading, and their lack of need for preservation of life or property, and having everything expendable as with the military, whereas nothing is expendable in commerce. So that in wartime you could do many things with military that you could not do ever with commercial aircraft in peacetime.

Mr. MACK. Of course, there are some large principal air terminals around the world today that have similar operations.

Captain RICKENBACKER. There is no question about it. You have one right here where the majority of your operations probably would be on that one runway, but there are times when it would not be, in our opinion at least. We have not arrived at that stage where we want to land down-wind or with a 50-mile-an-hour cross-wind. We do not consider that safe yet or we are not qualified, may I put it that way, to take that chance.

Mr. MACK. I know that there is some range, and perhaps 15 knots is the right range, but I do know of instances where the air carriers have taken off down-wind in a 6- or 10-mile-an-hour wind.

Mr. O'HARA. Will the gentleman yield? I would like to tell Captain Rickenbacker that this last winter we landed at Rio de Janeiro with a cross-wind that was about a single airstrip operation, with gusts 45 to 55 miles an hour, and we never knew it until we got out of the airplane.

Captain RICKENBACKER. We took off there a couple years ago, and we did know it. Maybe the passenger did not, but the pilot did. I remember that airport well. I was down through that country with a Constellation on a more or less of an educational good-will trip and survey. We covered 14 of the countries and all of the major airports in those countries. What you say is quite true. But I did not like it.

Mr. O'HARA. We did not like it either when we found out what it was.

Mr. MACK. I might add that I landed at an airport or two that had a slight cross-wind that I did not like.

Captain, in the same line, it would not make too much difference what airplane you were operating, the type of aircraft you were operating, for this cross-wind component? It would probably remain constant or should remain constant in your mind?

Captain RICKENBACKER. There is a difference, of course, between a tail wheel and a nose wheel, as you well appreciate, being a pilot; that you can land a much safer landing with nose wheel design aircraft. There is a stronger cross-wind component than with a tail wheel design. Then again, the wing loading has certain influences, as you well know.

Mr. MACK. I have no further questions, and I would like to compliment Captain Rickenbacker on a very fine statement and a very informative statement here today.

Captain RICKENBACKER. Thank you, sir.

Mr. WOLVERTON. Captain, having in mind the number of years that Newark Airport has been in operation, some 20 or 25 years, and having in mind the length of time that LaGuardia has been in operation, and that Idlewild has also been in operation, are you able to express any opinion with respect to the percentage of availability or desirability of Newark Airport over LaGuardia and Idlewild from a standpoint of weather conditions or otherwise?

Captain RICKENBACKER. I would say conservatively it would be 10 to 15 percent in favor of Newark, over the years.

Mr. WOLVERTON. It seems to me that it has come to my knowledge in years that have passed, or over a period of years, that frequently planes were unable to land at LaGuardia or Idlewild, that were able to come into Newark.

Captain RICKENBACKER. I have been in several of them myself, that is why I think so much of the Newark Airport.

Mr. WOLVERTON. Well, under the conditions that now prevail with Newark closed, what fields would be available in an emergency landing?

Captain RICKENBACKER. We have Westchester, we have Teterboro, we have MacArthur, and, of course, we have Hartford and Philadelphia, primarily.

Mr. WOLVERTON. Has the increased traffic load at LaGuardia and Idlewild increased the hazards existing at those two airports?

Captain RICKENBACKER. Well, I think I might answer that in this way, that in the first flush or blush of the closing of the Newark Airport we all did whatever we could in getting ourselves located and coordinated in LaGuardia and Idlewild. That is illustrated on our super Constellations. LaGuardia is not suited for landing and takeoff, and therefore they were all moved to Idlewild. Because of the natural loss of business, we of Eastern cancelled six schedules permanently because we had that much less business, and business that we lost, that we were operating for Newark and the Jersey area alone primarily.

I would like to be corrected on these figures, we have 680 peak in the period between the 11th of February and the 1st of March, caused by the shifting of schedules into LaGuardia and Idlewild. From a known average of around 520, we have had in the summertime as high as 750 movements into LaGuardia with perfect safety. But in view of the emotional and mental state, honestly, some of the people of Queens and Jackson Heights and Cedarhurst, I felt and the committee felt that any good we could do to alleviate any fears on the part of the people would automatically in the long run help aviation and help us and help them. And so we leaned over backward.

When we met for the first time, the coordinating committee, it was on two successive days, we recognized that we had to move fast. We did not want anything to happen, and we did not know when or how it might happen, because anything that moves, things happen to it, including the human body, and that is why we canceled out 226 movements and diverted them to different airports. We had the hearty cooperation of the Association of Corporate Ownership and the private fliers. We had outstanding cooperation from the military, even beyond what in my opinion was good judgment on their part in view of the problems they have confronting them and the necessity for building an air force which we are all trying to build.

Mr. WOLVERTON. Is the percentage of cancellations on account of weather any greater at LaGuardia and Idlewild than at Newark?

Captain RICKENBACKER. I would say no. Maybe I did not understand that question.

Mr. WOLVERTON. I say, is there any greater percentage of cancellations of flights at LaGuardia or Idlewild, greater on account of weather than at Newark?

Captain RICKENBACKER. Oh, definitely; positively. I would say again somewhere between 10 and 15 percent.

Mr. WOLVERTON. Now, I would like to shift my questioning, if I may, to another subject. It is not often that we have a witness before us with such a well-rounded experience as you possess, as a flyer and as an operation official, and so forth.

Now, I take it that you are familiar with Order No. 4 that was made on October 19 by the Petroleum Administration for Defense, that increased the tetraethyl lead content of gasoline and to relieve the tension on the alcolate, what is your experience with respect to the wisdom of the continuation of that order?

Captain RICKENBACKER. I opposed that, sir, violently at the time, to the extent of even appealing to some of the larger oil company managements, the heads of the companies. Originally we did have it postponed for awhile, the decision, and I do not know exactly how long, and I do not remember.

Mr. WOLVERTON. I think probably you have in mind that it was first suggested in September of 1950.

Captain RICKENBACKER. That is correct.

Mr. WOLVERTON. And it finally was not put into effect until October 19, 1951.

Captain RICKENBACKER. That is correct. We felt it was the wrong thing to do because the saving of alkaline that was consumed by the air-transportation industries was so insignificant by comparison with what they needed that the lead content from an economic point of view, if no other, automatically was unbalanced, not in favor of the decision but against it.

Naturally, we do not like lead any more than anybody else, in any form, if you get what I mean. It is not as efficient a fuel, it does affect spark plugs, we have to change spark plugs oftener, and we have to inspect them oftener. It is not conducive to the best operation of valve action or the proper maintenance of the proper setting of valves, whereas we have had trouble with it, it has been primarily not as much a safety problem as it has been a basic economic problem. Safety being considered, if you tried to operate the spark plugs as long as you would without the lead content or the percentage that we were forced to use, it would become a safety factor. If it is watched and inspected and controlled, as we try to, and I think everybody in the business does, it is fundamentally then an economic problem.

Mr. WOLVERTON. Well, did the use of gasoline of that content as fixed by the order of October 19 require that you should have more frequent inspections of your engines and overhauls at shorter periods of operation than had previously been the case?

Captain RICKENBACKER. No; as I said before, it has not affected us because we instigated immediately controls and inspections where we found it necessary, and we put in the shortened use of accessories such

as spark plugs so that we have not had any problem with it, but it could have been if we had not done that.

Mr. WOLVERTON. It has required you to be more alert in your examinations?

Captain RICKENBACKER. Positively.

Mr. WOLVERTON. The use of that lead, that could affect detrimentally the operation of the engine as a result of corrosion, could it not?

Captain RICKENBACKER. If you did not give it the proper control or inspection.

Mr. WOLVERTON. Would that affect or could that affect the take-off as well as the landing of airplanes?

Captain RICKENBACKER. Not in my opinion, if it is controlled and inspected. I do not think that there is any hazard there from that angle.

Mr. WOLVERTON. I would assume——

Captain RICKENBACKER. Pardon me, if you went along and tried to get the same hours out of spark plugs that you had been getting out of the non-lead fuel, why you might get into trouble, but we having had some experience during World War II with heavier lead content immediately instigated old procedures and controls and inspections.

Mr. WOLVERTON. There is no doubt, I take it from what you have said, that the use of gasoline as fixed by order No. 4 does require a more alert and more careful examination.

Captain RICKENBACKER. That is correct.

Mr. WOLVERTON. Than would otherwise be the case.

Captain RICKENBACKER. That is correct, sir.

Mr. WOLVERTON. Now, in the event of a failure to make that examination as frequently as it in your judgment should be made, could that not result detrimentally to the engines sufficiently that it would affect the take-off power?

Captain RICKENBACKER. It could, if it was neglected long enough.

Mr. WOLVERTON. What steps are taken, if any, by Federal agencies to inspect engines, spark plugs, or any other important part of the airplanes since this order of October 19 went into effect?

Captain RICKENBACKER. They have alerted everybody, and it is our responsibility to exercise the inspections, and it is the operators. They have standards that they set up and regular procedures where we follow them, but we go beyond that. We have always had theirs plus our own.

Mr. WOLVERTON. Has there been any let-down in the inspection activities of the Government as a result of decreased inspection forces?

Captain RICKENBACKER. Not with us there haven't. There may have been with somebody. We think they have got more than they need.

Mr. WOLVERTON. The statement was made to me last evening, not by an airplane operating official or anyone connected with it, as a matter of fact, but that the opinion had been expressed to him that as a result of decreased appropriations by Congress there had been necessitated the laying off of several hundred in the inspection force. Do you know whether there is any truth to that statement?

Captain RICKENBACKER. All I can say, Mr. Congressman, is that I am not familiar with the facts other than what I have read in the newspapers in the form of statements that might or might not be true. What I have seen is that they were going to have to do this, and not

that they had done it. I do not know whether they have or have not.

Mr. WOLVERTON. You said that you have strenuously opposed the making of that order of October 19 or the changing of the content of the gasoline when it was first suggested, probably in September of 1950. Did you make known your objection to the PAD?

Captain RICKENBACKER. Indeed.

Mr. WOLVERTON. Do you know whether others did likewise?

Captain RICKENBACKER. Yes, sir; the industry as a whole did. The Air Transport Association's experts, and the CAA or CAB or both also objected, and the industry individually as well as collectively through the Air Transport Association objected, and made known their objections in very positive form.

Mr. WOLVERTON. Is it true that the manufacturers of engines such as Pratt & Whitney likewise made objection.

Captain RICKENBACKER. As I remember, they also were vitally interested.

Mr. WOLVERTON. Has there been any change of opinion to your knowledge on the part of the airlines or governmental authorities, or engine manufacturers, or others interested, in their viewpoint?

Captain RICKENBACKER. Not in my opinion.

Mr. WOLVERTON. Well, then, I assume that if you had the authority, the order would not be in effect?

Captain RICKENBACKER. That is correct.

Mr. WOLVERTON. That is all.

Mr. BECKWORTH. I wanted to ask you this, Captain: One of the primary criticisms that some of the citizens in the densely populated areas have made is that as many as 300 or 400 or possibly 500 flights come over a series of houses per day. Whether or not that is accurate, I do not know. But in the event the kind of service that you have in mind——

Captain RICKENBACKER. I might state right there that as an illustration at LaGuardia, we have had, and voluntarily so, among the industry and the authorities involved, voluntarily set a maximum of 30 movements an hour in instrumentation weather. I think the figure which you quoted would be considerably higher than reality.

Mr. BECKWORTH. Would you repeat that, please?

Captain RICKENBACKER. I would think those figures you quoted as being stated are higher than is actually the case.

Mr. BECKWORTH. My question was this, though: In the event the kind of service that you have outlined is restored at Newark, are there any particular sections of Newark or Elizabeth or Linden or any of those towns near there where there would be a great number of flights per 24 hours over residential areas?

Captain RICKENBACKER. No, sir; positively not.

Mr. BECKWORTH. Your programing simply would not permit that to take place?

Captain RICKENBACKER. It would not permit that, any more than it does and has since the 11th day of February at LaGuardia.

Mr. BECKWORTH. I am glad to have that information, Captain. You mentioned that there have been great economic losses. Has your committee undertaken to arrive at what might be the annual economic loss as a result of the closing of this airport at Newark?

Captain RICKENBACKER. Yes, sir; we are compiling that data now, and I do not know when it will be available.

I have been informed that the final figures will be available in about a week, and the estimated figure is $30 million annually. I have detailed my own, and I have asked for other figures from the different operators and some of them have come in by telegram, and that is why I happen to know some of the figures that I quoted before of stated losses by a few of the operators. That is in actual out-of-pocket costs of moving and increased costs per month of operation and costs of loss of business per month.

Mr. BECKWORTH. You mentioned that if there are not some changes made beginning, say, in April—6 weeks from now, I believe you said—the movement of traffic will be even more handicapped than it is now.

Captain RICKENBACKER. No.

Mr. BECKWORTH. Did I misunderstand you?

Captain RICKENBACKER. No; you misunderstood. It would necessitate—that is, the fact that the business is still a seasonable business, that it would necessitate from the scheduling committee, which is a subcommittee or coordinates with our top committee, the industry has recommended an increase of 102 movements as of April 27 at the time we go into daylight-saving time and start the summer operations. That will increase as time goes on through the summer. As I stated also, that is above what we have now or what we have been cut back to at the moment. It would be the reinstating of some of those, plus the natural summer increase.

Mr. BECKWORTH. That is what I am trying to develop.

Captain RICKENBACKER. Now, the loss on that would be on top of what it is costing today.

Mr. BECKWORTH. Naturally this airport has been closed only a short time relatively. I am wondering if there is any season of the 18-month period where because of weather and because of the number of flights the situation will be worse than it has been during the period that the airport has been closed.

Captain RICKENBACKER. Economically, you mean?

Mr. BECKWORTH. No, so far as safety is concerned. In other words, is there some season of the year, at a time different than the period that the airport has been closed, where because of the additional traffic over and above what has taken place in the last few weeks, or because of the type of weather that characterizes the period of time that the safety factor will be endangered more than it has been, as a result of the closing of that airport?

Captain RICKENBACKER. The reason for the increase, and the reason we say it is seasonable, some people still do not believe that it is quite as safe to fly in the wintertime as it is in the summertime. Therefore, you have your seasonal traffic, plus your vacation traveler and your tourist travel in the summertime, when they do have their opportunity to get 2 weeks or 30 days off, or 3 weeks, and as far as the safety factor is concerned, I do not see any chance of that being affected.

Mr. BECKWORTH. Now, you mentioned that under your reprograming only about 4 percent of the flights, as I understand, would be over parts of Newark and Elizabeth. Did I understand that correctly?

Captain RICKENBACKER. When the new runway is completed, that is correct.

Mr. BECKWORTH. And in the meantime, not?

Captain RICKENBACKER. There would be none over Elizabeth. On a limited operations basis there would be none over Elizabeth. That is, under the present preferential runway lay-out.

Mr. BECKWORTH. I recall specifically about seven municipalities had witnesses when we were in there, and what about those other towns up there? We got the 4 percent figures for Elizabeth and Newark, and the other towns would not have any.

Captain RICKENBACKER. In my opinion there would be none, no; because they would be so high they would not be affected by noise and of course there is always a hazard of something happening over any city in the United States, whether they took off or landed there, or did not.

Mr. BECKWORTH. You have been a man who has always looked to the future, and evidenced great vision always. Do you forsee that in the next few years we not only will need the three airports up there—that is, Idlewild, LaGuardia, and Newark—but even more airports? Do you have any information by way of a forecast along that line?

Captain RICKENBACKER. Mr. Chairman, in my opinion we could never become a mass transportation industry, which it is essential that we do become, until such time as we have two to three times the airports, for this basic fundamental reason: That if we could today get the type of equipment that we know can be built, which would bring the price within range and the equipment was available, we know there are enough people who would prefer to fly and that number will increase for a good many years, that if we had the airplanes we would only have a third of the airports necessary to handle the airplanes in the air; that is, from the air to the ground. Therefore, I say that it will be at least 10, and maybe 15 years with a minimum of 10 years, before that can possibly happen because it will take 10 years to build the airports that will be needed for that type of service, and until we get that kind of a job done, and we are trying to do it in a piecemeal type of way now, and the industry has been all out in recognizing its responsibility for national defense, and many of them have bought millions of dollars worth of new equipment and have it on order, and I am in the process today of introducing two new fleets of airplanes which will cost me over $100 million, that will be completed by the middle of next year.

I know that other large operators and a lot of the small ones have ordered in anticipation, as I did, of the problem ahead.

Mr. BECKWORTH. Now, with reference to your committee, it is definite that airline pilots have worked along with you as you have conducted these studies that you talk about.

Captain RICKENBACKER. They cooperated 1,000 percent—the association as well as the pilots individually and collectively.

Mr. BECKWORTH. I know it is difficult sometimes for a fellow to know whether or not his remarks have met with the approval of everybody, but I presume that you have stated what they would agree with here. I am talking about the airline pilots.

Captain RICKENBACKER. That is correct.

Mr. BECKWORTH. That is true this afternoon; is it?

Captain RICKENBACKER. Yes, that is correct.

Mr. BECKWORTH. I just wanted to be sure about that.

Captain RICKENBACKER. We have the president here, and if he cares to discount my statements or refute them, I would be happy.

STATEMENT OF C. M. SAYEN, PRESIDENT, AIR LINE PILOTS ASSOCIATION, WASHINGTON, D. C.

Mr. SAYEN. I have no further statement than that we are in general agreement with Captain Rickenbacker.

Mr. BECKWORTH. Would you identify yourself for the record, please?

Mr. SAYEN. Sayen, president of the Air Line Pilots Association. And I will say that we are in general agreement with the statements that Captain Rickenbacker has given you this afternoon.

Mr. BECKWORTH. Thank you very much.

Mr. HINSHAW. Now, awhile ago Mr. Wolverton asked Captain Rickenbacker a question concerning the hazards that might results to take-off from using an aviation-type gasoline that had a high lead content, and it has been suggested that perhaps I might relate to you something of the testimony that was given before this committee the other day by a Mr. Drogemueller, of Pratt & Whitney, when he was before us a week ago. He pointed out that the Pratt & Whitney engine, the 2,800 and up from that, when it comes in to a landing and taxis to a ramp, that the high lead content gasoline will form a certain amount of lead oxide on spark plugs, and that upon the engine being shut off during the 15 or 20 minutes that it remains on the ramp and being restarted again, and taxying back to the take-off end of the runway, that additional quantities of lead oxide would necessarily be deposited on spark plugs. Then upon the take-off of the aircraft under full power or whatever you call it on take-off, the cylinder head temperature when it reaches 700 degrees or thereabout, the lead oxide would become deoxidized by virtue of the full rich mixture and the high temperature, leaving in effect a lead coating on the spark plugs which could cause an outside short on the spark plugs, and that in consequence thereof the most hazardous point of operation, using high tetraethyl lead content gasoline, was on take-off.

Now, a letter from the Navy Department or a quotation from the letter from the Navy Department which was introduced in that same hearing said that the Navy Department was employing, I believe they called it, a scouring compound in this high content tetraethyl gasoline they were using with the intent of preventing the formation of lead oxide on the spark plugs or removing it—and I do not just remember which—but at all events, to eliminate that particular possibility of outside shorting of spark plugs.

Now, it was pointed out by Mr. Drogemueller that this difficulty, if it was going to occur, would probably occur very shortly after the plane took the air, because the temperatures of the cylinder heads would then reach this high degree of 700 approximately, and possibly a little more, and particularly in view of the fact that the high lead content gasoline was being used, that a richer mixture was required than would ordinarily be the case with the alcolate mixture of the gasoline; that added to the difficulties that were involved.

Now, I do not know whether or not the aviation gasoline supplied to the commercial air carriers contains this scouring compound or whether it is necessarily added to the gasoline after it has been put

into either the main tank or the tanks of the airplane, but in view of that statement by the gentleman from Pratt & Whitney, who apparently has been conducting a research project on the subject, perhaps if cognizance has not already been taken of that, that it should be. I would like to have your opinion.

STATEMENT OF CAPT. EDDIE RICKENBACKER, PRESIDENT OF EASTERN AIR LINES, AND CHAIRMAN OF THE AIRLINES COMMITTEE, NEW YORK, N. Y.—Resumed

Captain RICKENBACKER. Frankly, I do not know enough about it to intelligently answer it, because I have not gotten into that great detail with reference to the problem.

Mr. HINSHAW. Obviously, if the Pratt & Whitney Co. thinks it is a problem, it deserves attention.

Captain RICKENBACKER. There is no doubt of it, and in all probability they have brought it to the attention of our operating people.

Mr. HINSHAW. I would assume so.

Captain RICKENBACKER. Because they coordinate immediately when there is a question, as we try to coordinate between ourselves. In other words, if we, operating Constellations, have a problem, we coordinate that through the ATA immediately, the Air Transport Association, which in turn contact all operators and the manufacturers, and he in turn contacts all of the international operators, and that practice is reversed in the same way by them.

Mr. HINSHAW. That testimony became of great interest to this committee because, of course, these accidents, two of them having been on take-off, the first one obviously lost a cylinder completely.

Captain RICKENBACKER. He lost it not because of the lead.

Mr. HINSHAW. He just lost it, but the third one did lose an engine on take-off and then had something peculiar happen which resulted in the propeller on the second engine being found in reverse position upon the wreck being gone into, and so we are particularly concerned in this committee that certainly the proper steps be taken to minimize the possibility of losses of engines on take-off under these conditions.

Captain RICKENBACKER. Or anywhere else.

Mr. HINSHAW. But in take-off as being very important in congested areas.

Captain RICKENBACKER. That is the crucial period, congestion or noncongestion.

Mr. HINSHAW. It is crucial from the standpoint of public relations, let us say, in congested areas.

Captain RICKENBACKER. That is correct.

Mr. HINSHAW. At least, we will say that.

Captain RICKENBACKER. Crucial from a life angle and an economic angle.

STATEMENT OF C. R. SMITH, PRESIDENT OF AMERICAN AIRLINES, INC.

Mr. SMITH. I have been sitting back in this audience listening. Mr. Littlewood, our chief engineer, happens to be here, and when Mr. Rickenbacker has completed his testimony, I think he can answer some of your questions about the lead content.

Mr. HINSHAW. We would be very much interested.

STATEMENT OF CAPT. EDDIE RICKENBACKER, PRESIDENT OF EASTERN AIR LINES, AND CHAIRMAN OF THE AIRLINES COMMITTEE, NEW YORK CITY, N. Y.—Resumed

Mr. BECKWORTH. Are there any other questions or comments?

Captain Rickenbacker, the committee certainly does appreciate the very interesting and instructive and enlightening statement that you have given the committee. We realize you have made unusual contributions to aviation and to our country in several other ways, or many other ways, and the committee, I know, feels that your statement and your enlightening testimony is a real contribution to the committee.

Captain RICKENBACKER. I want to thank you gentlemen, in behalf of our committee, for the time and patience you have had with me.

Thank you.

STATEMENT OF C. R. SMITH, PRESIDENT OF AMERICAN AIRLINES, INC.—Resumed

Mr. SMITH. With reference to this problem of chasing airports out into the country, I think when your time would permit you might take some general testimony on that subject, because I quite well remember when LaGuardia Airport was built the runway approaches were over a relatively unpopulated territory, because I remember close to runway 4, within a mile and a quarter, there were about 3,000 people living there, and today there are over 11,000 people. The population increased at the end of runway 4, I think, 382 percent since the airport has been in operation. I am sure that a great many of the people who live at the end of runway No. 4 at LaGuardia built their houses with airplanes flying over them every 5 minutes at 500 feet during the entire construction time.

Now, to take a specific section at Baltimore—they certainly went out in the country to build an airport, and they picked a splendid site, reasonably isolated, with good approaches, and I think that you will find in the newspaper less than a week ago that someone is now given a construction contract for 300 houses to be built adjacent to that very fine airport, so that what may be an isolated location today might be a very densely settled section 10 years from now, and, with the hundreds of millions of dollars invested in airports, I do not think that you can undertake as a public policy moving an airport every time people congregate around it, because we are going to have that problem from now on.

I did not want to make a long speech on it, but I certainly think that that is a part of the problem.

Mr. O'HARA. Mr. Smith, what you have just stated applies to most of the large airports of the country, to some extent?

Mr. SMITH. There is no doubt about it. It is a universal situation.

Mr. O'HARA. The only one offhand that I have landed at that does not apply would be Chicago, probably. That airport is pretty much—I think when that was constructed the general residential district was pretty well built up at that time.

Mr. SMITH. That is right, although I lived at Chicago for many years, and I would say that the population around the Chicago Air-

port has probably increased 500 percent in 15 years within 2 miles of the airport. I do not want to take a lot of your time, but we consider in American Air Lines this lead in the gasoline one of our No. 1 problems, and I think that Captain Rickenbacker does also in his company, as he has said.

I did not invite Mr. Littlewood here for the purpose of testifying, and I did not know he was going to be here, but he is vice president in charge of operations for American, and I am sure he does not want to make a long speech, but if you want to ask him some questions about the lead situation, I think it would be helpful.

Mr. WOLVERTON. I was only going to confirm, if any confirmation was necessary, and of course it is not, as to what Mr. Smith said about the conditions surrounding LaGuardia when it operated back in 1939, I think it was. I happened to be present on the occasion of the opening of that airport, and I was a member of this committee. I took occasion to refer to that on Monday, when we took testimony in New York City. One of the witnesses who appeared before us in New York City described the landing in LaGuardia as comparable to diving into a cavern because of the great number of houses and apartment houses, and so forth, that surround it.

In other words, his description would indicate that you were diving down into a cavern in order to make the landing. Well, I asked him as to when that condition arose, and whether it was the case when the airport was built there, and he sought to give the impression that that was the condition then, that the houses were surrounding LaGuardia at that time, and I differed with him. I said that my recollection was that it was a very open space the day we were there for the dedication of that airport, and that it seemed to me that I was out on an island almost, it was all open around us, and the wind was blowing terrifically hard because of the sweep of open space that was there.

So as you have said, whatever building is there has largely come about since the airport was located there?

Mr. SMITH. That is correct.

Mr. BECKWORTH. Thank you, General Smith.

Mr. BECKWORTH. Would you care to make a brief statement, Mr. Littlewood, right at first, about your feeling on this matter?

STATEMENT OF WILLIAM LITTLEWOOD, VICE PRESIDENT IN CHARGE OF ENGINEERING OF AMERICAN AIRLINES, INC.

Mr. LITTLEWOOD. I would be very happy to.

I find nothing to take exception to in the quotations from Mr. Drogmeller's work, or the statements made. I think the effect, however, is one qualitative rather than quantitative with respect to the danger induced in any specific take-off by the formations of lead. Certainly formations of lead within the engine have deleterious effects which are in proportion to the amount of lead contained per gallon, and are critical with respect to the various temperatures in any particular engine, such as the characteristic spark-plug temperatures, and the cylinder and valve temperatures, and what not.

We in the airlines became concerned about lead as a troublemaker many years ago, and before the war we had, by agreement with the vendors of fuels, agreed to a maximum of 3 cubic centimeters of lead per gallon of fuel. During the war we were of necessity required to

increase the lead content to make available to the military substantially more fuel, and during that time we noted a serious appreciation of lead difficulties and difficulties attributable to lead. That was more spark-plug fouling, and more ring-sticking, and more accumulations of lead within the engine, accumulations even in the oil within the engine, and the lead gets down past the pistons and mixes with the oil and causes difficulties there in the way of stoppages of oil passages, and what not.

Those things are controlled by care at overhaul, more frequent overhauls, more frequent inspections of plugs, and you are always vulnerable to rough-running engines and some loss of power under conditions of operation, due to the accumulations caused by the lead.

Lead also caused in the early airplanes considerable amounts of bromides caused by lead gases. After the war we reverted to the desirable maximum of 3 cubic centimeters per gallon and it has only been of recent date that we have been requested to contemplate the use of more, up to 4 cubic centimeters per gallon, which we view with considerable concern, because of these aggravated difficulties.

The use of the lead scouring agent, which is triethyl phosphate, has been pioneered by the Shell Oil Co. and is under experimental use by the Navy and by the airlines to identify the amount of benefit to be achieved by its use. The reports to date are that it is very promising, but we are still unable to state positively its full beneficent effects.

That is all that I would like to say in the way of a preliminary statement, and, if you have any questions, I would be glad to answer them if I can.

Mr. HINSHAW. I would like to ask some questions of the gentleman.

Have you found any engine failures that could be directly attributed to lead fouling or other lead difficulties?

Mr. LITTLEWOOD. I know of no specific engine failures that are directly attributable to the high content of lead. However, cumulative effects occur, such as the accumulation of high lead slug in the cracks in recesses of the engine, which finally could conceivably stop oil passages. However, attributing an engine failure to that cause is something that I could not say we have ever done. Nevertheless, the tendency is there. The slugging of clutches, for instance, and the inability to get into high gear, which is not a dangerous type of trouble, nevertheless it is an engine difficulty which frequently requires removal of the engine prematurely.

The effect of lead on spark plug formations is causing sometimes shorting of plugs, since there are two plugs per cylinder, and the likelihood of multiple plug foulings on any one engine at the same time within the few seconds of critical take-off power is very unlikely. It results mainly in some depreciation of take-off power. But that is always checked by checking the engines on right and left mag prior to take-off to see that full power is available or at least an indicated power is available so the take-off is considered to be perfectly safe.

There could, however, be a small percentage loss of power during take-off which of course is adverse and undesirable. However, it is not to any dangerous degree.

Mr. HINSHAW. I would like to point out that as Captain Rickenbacker said, the chances were almost infinite against three airplanes dropping close to each other at Elizabeth, N. J., and of course, let us

say that the chances are infinite against the sort of thing happening that you are talking about. At the same time I would assume that it could cause rough engines.

Mr. LITTLEWOOD. It could cause rough engines and a loss of maximum available power.

Mr. HINSHAW. And rough engines in the case that occurred in more than two cylinders simultaneously, that might cause a pilot to decide to feather that particular engine?

Mr. LITTLEWOOD. That is true.

Mr. HINSHAW. And I suppose the chances would be infinite against the occurrence of a reversing propeller on another engine at the same time.

Mr. LITTLEWOOD. Almost so; it is very hard to conceive, but it is perfectly possible.

Mr. HINSHAW. It is possible, is it not?

Mr. LITTLEWOOD. Yes, indeed.

Mr. HINSHAW. Now, in connection with the lead content and the high-lead-content gasoline it has been suggested to the committee that in connection with the governor, that the engine oil is used in the governor and also in the propeller hub, and if slug or particles of salts or otherwise should enter the governor mechanism through the screens that are in between, or should form en route and lodge in the governor, it could likewise cause some difficulty.

Now, governor trouble is not unknown to this committee. This committee experienced a governor that went wild not long ago on a trip that it was making and we did not enjoy it particularly, but on the other hand it was an experience. Have you in your experience found that a governor could go wild as a result of higher-content-lead gasoline than otherwise?

Mr. LITTLEWOOD. As far as I know, there has been no direct association between governor difficulties and the occurrence of high lead in the gasoline. In other words, the question of whether you have 3 cubic centimeters of lead and an accumulation of a certain rate of slug or whether you have 4 cubic centimeters and accumulate a somewhat higher rate of slug, the result, I believe, would be qualitative and very difficult to identify quantitatively, and I know of no particular instances in which governor difficulties are attributable to lead in the gasoline.

Mr. HINSHAW. That brings me down to a point as to whether or not in the event of these malfunctions, specific attention is given to identify what component or what factor, let us say, lead may have played in it.

Mr. LITTLEWOOD. There have been many studies made by the oil companies themselves and by the airlines and their engineering staffs and by particularly the engine companies and their engineering staffs, such as the studies Mr. Drogmeller is now making for Pratt & Whitney. They have been very intensive investigations to identify the exact cause of these troubles and how to eliminate them. The question in an engine is somewhat as to what you can safely tolerate. In other words, if the only fuel available to you is one which has a high lead content, you have to perhaps redesign some elements of the engine to accommodate that fuel with reliability. In other words, you would prefer a fuel which gives you no such difficulty so that the existing design is completely satisfactory as it is.

We have over the years, for instance, gone from no lead in our fuel to 1 cubic centimeter, 2 cubic centimeters, and 3 cubic centimeters, and we had set that as our very desirable maximum, but we have been requested during the war, and now we are requested again, to go to 4 cubic centimeters, which we anticipate will give increasing difficulties.

Mr. HINSHAW. I believe Mr. Drogmeller expressed himself as saying that beginning with an added 3 cubic centimeters that the chances of difficulties mounted logarithmically.

Mr. LITTLEWOOD. I think that that is a debatable statement.

Mr. HINSHAW. I think 3.2 is the point where he started.

Mr. LITTLEWOOD. They do go up aggressively with increases of lead, and whether it is logarithmically or not, I do not know.

I should say again that is the type of increase of difficulties, as it is with temperature, the same thing.

Mr. O'HARA. I suppose this lead in gasoline is a good deal like a drug that you take, and it is very good for you if you take a limited amount, but you get a little above what they tell you and it is very bad for you.

Mr. LITTLEWOOD. There is a tolerance limit, apparently, to it; yes.

Mr. HINSHAW. Did I understand you to say that you are experimenting with this scouring device?

Mr. LITTLEWOOD. That is TCP, so-called, now being added experimentally to the fuels of some of our airplanes in order to identify its benefits, the nature and extent of its benefits. Reports to date are that the evidence is promising, but we are not prepared to reach a conclusive evidence on it. The work has been in effect about 2 to 3 months now, the experimental runs.

Mr. HINSHAW. Now, one final question. I believe the statement was made originally by General Arnold, of the Air Transport Association, although it may have been made by others, that the change to the use of this, of the regular type of aviation gasoline, to this other type having a higher lead content which means less alcolate, would necessarily result in additional quantities of gasoline being used to perform the same work than would otherwise be used.

Mr. LITTLEWOOD. That, I believe, is consistent with Mr. Drogmeller's statement also that the mixture must be somewhat richened in order to achieve the same temperature benefits and octane rating with a given fuel with lead as with alcolate. In other words, the effective octane at high-power take-off is decreased some by the use of lead as compared with an alcolate fuel of the same nominal octane value.

Mr. HINSHAW. Has it been possible to make any determination in that respect in connection with your own operations?

Mr. LITTLEWOOD. Studies are currently under way to identify the amount of fuel involved in such a comparison, so that facts can be presented frequently to the PAD to prove or disprove the benefits to be achieved under their claims for the use of lead instead of alcolate in the conservation of fuel for the military forces.

Mr. HINSHAW. Has there been any indication at this point that would be useful to us in our work?

Mr. LITTLEWOOD. In the very near future there will be another meeting of the committee, the technical group working on that subject, and there is nothing ready quite yet, but there will be something in the

near future, and I am sure we will be very happy to forward to the committee any information that we might have on the subject.

Mr. HINSHAW. That might be very difficult to identify, but it might be in the over-all work done by aircraft and gasoline consumers.

Mr. LITTLEWOOD. General Arnold will have access directly to that information since it is his committee that is working on it.

Mr. BECKWORTH. If there are no questions, thank you very much.

STATEMENT OF C. ROY CHALK, PRESIDENT OF THE INDEPENDENT MILITARY AIR TRANSPORT ASSOCIATION, WASHINGTON, D. C.

Mr. CHALK. Roy Chalk, president of the Independent Military Air Transport Association, representing the nonscheduled airlines on the committee with Captain Rickenbacker.

I would merely like to say for the record that we are in wholehearted accord with Captain Rickenbacker's excellent presentation.

Mr. BECKWORTH. Thank you very much.

The committee is adjourned, subject to the call of the Chair.

(Whereupon, at 5:10 p. m., the committee was adjourned, subject to the call of the Chair.)

AVIATION SAFETY

TUESDAY, MARCH 18, 1952

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE OF THE COMMITTEE ON
INTERSTATE AND FOREIGN COMMERCE,
Washington, D. C.

The subcommittee met at 4:30 p. m., pursuant to call, in the Town Room of the Statler Hotel, Hon. Arthur G. Klein, presiding.

Mr. KLEIN. The subcommittee will be in order.

All right, Mr. Martin.

STATEMENT OF ERLE MARTIN, GENERAL MANAGER OF HAMILTON STANDARD DIVISION, UNITED AIRCRAFT CORP.

Mr. MARTIN. My name is Erle Martin, general manager of Hamilton Standard Division of United Aircraft Corporation.

I brought these pamphlets along, which contain more detailed information. It will save us some time to dispense with reading them and going into that much detail now.

Briefly I would like to tell you some of the background of this company. We are probably the oldest propeller manufacturer in the world. Actually, our heritage goes back to about 1910. In 1925, we developed the adjustable metal propeller. Prior to that time all propellers had been made of wood.

In 1930 we developed the controllable propeller. In 1934 we were awarded the Collier Trophy for the development of a proven controllable-pitch propeller. This was the first time that controllable-pitch propellers had been used in commercial transport.

In 1935, we developed the constant-speed control. That is an automatic device that permits the propeller to hold engine speed at a constant figure.

In 1938, we introduced the feathering propeller, which then became standard equipment on all of the airlines. It was the principal propeller in this country's possession when we entered World War II, and approximately 75 percent of the military propellers built during the war were of that design.

Since 1935 we have been working on reversing. Our initial reversing work was for the military in order to reduce the diving speed of dive bombers and increase their accuracy. During the war the military in particular found that they had a great need for reversing propellers, and the postwar transports were designed to use reversing.

So in 1946, we actually introduced the reversing propeller into commercial service. Since that time, we estimate that propellers have been reversed on landing of aircraft over 1 million times in com-

mercial service. There probably are over 5,000 reversing propellers flying now.

During the period from 1935 to 1946, when we were developing this reversing propeller, our principal concern was to find some way to introduce it safely into service. We knew from our previous history and from our experience, even with feathering, that any nonflying position of the pitch of the blades can be dangerous. We wanted to make sure that we had adequate safeguards.

Our initial work did not include mechanical low-pitch stops, and our testing revealed that such stops had to be added.

The other major achievement that we have contributed to the safety of propellers is our work during the 1930's on the greatest trouble that propellers then experienced—structural failures. It is unfortunate but true that any limited amount of testing or qualification testing is not adequate to prove that a propeller will be structurally safe after 5,000 hours, or 10,000 hours, or 20,000 hours of service. During that period we learned the hard way by having them break. We modified them and tried to stop it. But we felt it was essential for safe transport to have some means of measuring the laboratory stress level; and by 1938 we had developed such a stress-measuring device.

Mr. Kearns, who is here with me, was one of the principal engineers in that work, and the things he has done there have been recognized. He has received the Lawrence Sperry Award for the Institute of the Aeronautical Sciences, and the Longstrath Medal of the Franklin Institute for the work he has done in vibratory-stress measurement.

I have little else to say, and I think that it might interest you to know that over 98 percent of the United States-flag airliners use our propellers. That is, over 90 percent of the propellers flying on the scheduled United States airlines are Hamilton Standard.

Toward the end of the war that wasn't so, but we have regained a very good position there, in our estimation.

Hamilton Standard is an organization of about 5,200 people, about 1,000 of them in engineering. And on the subject of small business, which everybody always seems to be interested in, we deal with 3,000 suppliers, 80 percent of whom are in the small-business category. Fifty percent of our cost effort is subcontracted.

We are moving our activities this spring into an 800,000-square-foot plant in order to provide some expansion for us, also to permit Pratt & Whitney aircraft to occupy our present plant and expand their engine activities.

There are, as I said, further details regarding Hamilton Standard in this booklet, if you are interested. You are welcome to a copy of it.

Mr. KLEIN. You say that 90 percent of the American-operated airlines use your propeller?

Mr. MARTIN. Yes, sir.

Mr. KLEIN. Who makes the other 10 percent? Is it one company or are there different companies?

Mr. MARTIN. Curtiss-Wright are the only other people whose propellers are being used commercially. There is a third major propeller company, which is a division of General Motors, but none of their propellers are being used commercially at the present time.

Mr. KLEIN. Do some of the airlines use planes which have your propellers, as well as some of the others?

Mr. MARTIN. Yes.

Mr. KLEIN. You wouldn't say that one airline would use only Hamilton propellers?

Mr. MARTIN. No. That is correct. There are several airlines that have a few Curtiss installations.

Mr. KLEIN. With regard specifically to the three accidents which took place in the vicinity of Elizabeth, N. J., were they equipped with Hamilton propellers?

Mr. MARTIN. They were.

Mr. KLEIN. All three of them?

Mr. MARTIN. The first one was equipped with a propeller of our design made by a licensee of ours during the war. It wasn't of our own manufacture but it was of our design.

Mr. HINSHAW. Well, that first plane which had the accident was a C–46, and the propeller on it was not reversible, was it?

Mr. MARTIN. That is right.

Mr. HINSHAW. And the other two both had reversible propellers, and they were Hamilton Standard propellers?

Mr. MARTIN. That is correct.

Mr. HINSHAW. Were they both of the same design, including the mechanisms, or was there a difference?

Mr. MARTIN. They were in principle the same, and they were actually two different sizes of propellers that have a good many detailed design differences. One was of this exact size on the table behind you here.

Mr. HINSHAW. Which one was that?

Mr. MARTIN. That is National's.

Mr. HINSHAW. On the DC–6?

Mr. MARTIN. Yes. And the Convair was a larger hub model than that.

Mr. HINSHAW. You are going to have somebody discuss those two situations?

Mr. MARTIN. Yes.

Mr. KLEIN. You say the C–46 did not have a reversible propeller. Do not any of the C–46's have them, or just that particular one?

Mr. MARTIN. To the best of my knowledge, none of them have. However, some C–46's have Curtiss propellers, and I am not sure whether those are reversible or not.

Mr. KLEIN. Is that all with this witness?

Mr. HINSHAW. I think so.

Mr. ROGERS. You do not apprehend there were any defects in the propellers that contributed to the accidents, do you?

Mr. MARTIN. We don't think so.

Mr. KLEIN. Not in yours, anyway?

Mr. MARTIN. Not in ours.

Mr. KLEIN. Which one of you gentlemen will testify?

STATEMENT OF CHARLES M. KEARNS, ENGINEERING MANAGER OF HAMILTON STANDARD DIVISION, UNITED AIRCRAFT CORP.

Mr. KEARNS. My name is Charles M. Kearns, and I am engineering manager of Hamilton Standard.

Mr. KLEIN. That is a subsidiary of United Aircraft, is it not?

Mr. KEARNS. It is an operating division of United.

The main thing I would like to tell you gentlemen is something I guess you know already: that the modern propeller has become a very complex and at the same time highly refined mechanism as it has progressed from the original wooden slab, through controllable pitch and through feathering and through reversing, with electric heaters contained in the blades for throwing off ice as it is formed. All of these are progressive contributions to aircraft safety, improving performance, and catering to the problems of all-weather flying as they have arisen.

The propeller itself is a hydraulic mechanism which uses oil from the engine-oil supply, that is pumped up to a proper working pressure and valved by a governor to control engine speed at the will of the pilot. There are subsidiary control systems which enable the propeller to be feathered very rapidly, so as to cut down the drag which would arise after an engine failure if the blades were not turned into a feathered position.

One of the features that we worked very hard on has been the speed of feathering, since when an emergency arises you want to cut the drag right down. This propeller can feather in 2 or 3 seconds.

Mr. KLEIN. Of course, I think Mr. Hinshaw is the only engineer on this committee, and would you tell us in simple language just what feathering is?

Mr. KEARNS. I can show you very simply, if you would like, right here.

In normal flight, a propeller blade is at an angle. The propeller rotates in this direction, so that in effect, the air is pushed behind it and thrust is developed. It takes force, applied by the engine, to produce the thrust. When all goes well, the propeller varies its angle over about a 20° range from something like 20° more than flat pitch to about 40° or 45°. However, if the engine power were suddenly to cease, then the airstream advancing on this propeller would produce forces on the blade which cause the propeller to continue rotation, and it continues to rotate the engine, which perhaps has a failed part, let us say. The energy that is taken from the airstream to cause this rotation results in a drag on the airplane.

It is in order to eliminate that drag at the time when you have a loss of positive thrust, to prevent it from becoming negative, that the propeller is feathered. We will feather this propeller. The blade angle is increased, so that now the air approaches through the sharp edge of the blade, and the propeller remains stationary, and the drag is a negligible quantity.

Mr. KLEIN. When it is in that position, the force of the air on it does not make it turn around as it would if it were flat?

Mr. KEARNS. And moreover, the force is reduced to a minimum because of the small area that the blade presents to the approaching stream.

Mr. KLEIN. Is that what you call feathering, when you get it in this position?

Mr. KEARNS. Yes.

Mr. KLEIN. Does that require some manual operation by the pilot in order to get it in that position?

Mr. KEARNS. The pilot has a series of push buttons, red buttons, prominently displayed.

Mr. KLEIN. We went over that before, but I would like to have that on the record.

Mr. KEARNS. He simply presses a button once, and an automatic system takes over from there. He needs to do nothing further, and the propeller feathers and stops.

Mr. KLEIN. Regardless of what may be happening in the motor you could still press that button and make the propeller of this plane be in a feathered position, is that right?

Mr. KEARNS. That is right.

Mr. KLEIN. All right; will you proceed, please?

Mr. KEARNS. That is certainly a most important feature of the propeller.

Then as an additional contribution to maneuvering the airplane, such as on an icy runway when the brakes are ineffective even though they may be mechanically sound, the additional feature of reversing has been supplied. The blades, instead of being in what is now this positive thrust and positive pitch position, can be rotated, as we will show you, so that a continued supply of power from the motor now produces a thrust force and pushes the air back or a thrust to the rear, which acts to slow down the airplane.

Mr. KLEIN. When you reverse it, you have the same effect, and if you want to use it as a brake you reverse the propeller?

Mr. KEARNS. That is right.

Now, there are a number of other features about a modern propeller in the interests of passenger comfort and aircraft efficiency. With a multiengine airplane, it is desirable to get all of the propellers running at exactly the same speed across the airplane. If they are not at quite the same speed, there is a throbbing and humming, undulating sound.

Mr. KLEIN. Does it have any effect on the motion of the plane?

Mr. KEARNS. No; it is not discernible in that way. It is largely an audible impression that you get.

Mr. KLEIN. Your division makes just this propeller, and so you have nothing to do with the engine manufacture?

Mr. KEARNS. That is right. We make propellers that are used on all of the principal aircraft engines in the world, really, except for those of Russia; there, so far as we know, many of our designs have been copied.

Mr. KLEIN. Do you make them for military planes, also?

Mr. KEARNS. We do.

Now, as I say, the principal points are that these propellers have refined functions, lightweight, rapid action, and reliable mechanical mechanisms, and, as Mr. Martin pointed out, a lot of engineering effort—which simply can't be seen in looking at the final article—in making sure that all the vibratory stresses throughout the whole blade, the hub, and the assembly—all of those vibratory stresses which could result in a fatigue failure—crystallization after a long period of time—are controlled to prevent such failures.

Mr. KLEIN. Is the propeller installed by your company?

Mr. KEARNS. We sell the propellers to the aircraft manufacturers, usually, who install them.

Mr. KLEIN. In other words, your effort ceases as soon as you sell the propeller, after you have finished with its manufacture?

Mr. KEARNS. Actually, our effort truly doesn't cease, because we are vitally interested in the subsequent performance of the product, and we follow it quite closely. But there is a sharp line of responsibility; you are quite correct.

Mr. KLEIN. Do your people maintain or do you have a maintenance department which repairs these propellers if they should go wrong?

Mr. KEARNS. That is done in two ways. For example, if we sell a propeller for an airline's airplane, and if it is a large, established airline, they will take care of its subsequent overhaul and maintenance. However, many private operators—commercial concerns who own one or two airplanes and want to have them serviced—send them around to us and we take care of them.

Mr. MARTIN. We have a service organization that works with the airlines, to help them do their maintenance.

Mr. KLEIN. If you should receive a complaint from one of the airlines, do you send a man over to look at it, or do they have to disassemble the propeller and send it back to you, and then you examine it at your plant?

Mr. KEARNS. We have regional servicemen who are often stationed with a major airline at its overhaul base, or if he isn't there at the time, he is on call. So they are spotted all over the world and available for help.

Mr. WOLVERTON. With that exhibit before us as an illustration, would you point out to us what part your company is engaged in? Is it just in the propeller, or does it come down into that mechanism that may be spoken of as the dome? Just where does it end?

Mr. KEARNS. I will point out the parts that we supply.

Within the center of this propeller is a shaft which is a standard—there are a series of sizes, but agreed upon by industry and the Government, so that engines in a given power class have a certain standard size of shaft, and this is a 60 size. There the engine ends. All of the parts surrounding that shaft, including this brush housing for transfer of electric current for the electric heaters that are inside the blade, are supplied by us.

We also supply this element which mounts on the engine nose; that is the governor that can be set to control propeller speed at the pilot's will. The speed of that governor is changed or established by setting a certain spring tension inside of it, which can be done manually; and it is done in certain aircraft designs by a cable and pulley system, which we do not supply; or it can be set as here, with a small electric motor and reduction gear, which part we do supply as in this particular illustration.

Also, we supply a pump and auxiliary motor which can be used to aid the governor in feathering the propeller rapidly, or reversing it rapidly, or in controlling the propeller pitch when the engine is not rotating. That may be desirable for one reason or another.

Then, in addition to these elements, there are certain other control components throughout the airplane, including certain relays that contact various electric currents to perform the feathering function and the reversing function, and so on.

There is a control box for the electric heater system, which cycles one propeller on, and then another, and another, and then another; and then it comes back and repeats the process, to economize on electricity.

And then we supply usually just one other component in the cockpit, which is the feathering push button.

In other words, those parts, those elements of the control system which have a really vital function, we supply ourselves, although others could supply them if they wished.

Mr. WOLVERTON. Will you point out what is referred to as the dome?

Mr. KEARNS. This is the dome of the propeller [indicating].

Mr. WOLVERTON. Do you manufacture that?

Mr. KEARNS. We do.

Mr. WOLVERTON. How far are you able to express an opinion with respect to the possibility of corrosion in the dome or any of the parts that you have referred to as being connected with the operation of the propeller?

Mr. KEARNS. Well, I think that I can express an opinion. We protect these parts in general with a plating, either zinc or cadmium, to minimize, first, any tendency to corrosion.

Then secondly, being bathed in the lubricating oil under pressure at all times, the system remains quite clean.

There are a number of stainless steel parts; there are certain rings that are bronze, and so on.

So as a matter of practice now, we have learned which parts need to be corrosion-protected, and in what way, and have carefully taken care of the requirement.

Mr. WOLVERTON. Are we attaching too much importance to the corrosion effect of tetraethyl lead in the quantity that is now provided by order No. 4?

Mr. KEARNS. Well, I haven't been following the proceedings of your committee closely enough to be sure exactly what importance you do attach to it, but I would say this, that we have——

Mr. WOLVERTON. What, if any, importance would you attach to it, which is more importance than what we would attach to it?

Mr. KEARNS. I will give you my opinion. It is that as the lead content is increased we do find that more frequent maintenance of the dome region is required than formerly, but that that seems to be a perfectly straightforward situation, if you will, and proper maintenance measures do quite adequately take care of it. So I can say that I observe no critical effect.

Mr. WOLVERTON. Is that answer based upon the assumption that there is a proper examination at appropriate times for the presence of corrosion?

Mr. KEARNS. That is quite so.

Mr. WOLVERTON. In the event that there was not that care observed, how would that find expression in the operation of the propeller or any of its parts? Have I made it clear?

Mr. KEARNS. Yes; I think I understand what you mean. I think the principal effect that you would find would be a sluggish operation which would become noticeable to the pilot. It would call for finding out what is wrong with No. 4 propeller.

Mr. WOLVERTON. Would that create the possibility of accident from any standpoint whatsoever?

Mr. KEARNS. I think surely that if sludge and other accumulations were permitted to go completley uncared for that after a while the propeller would cease to function.

Mr. KLEIN. Could it happen suddenly?

Mr. KEARNS. I think not. It is a very gradual accumulation.

Mr. KLEIN. There would come a point where you might have some bad effect from the fact that it has gotten so bad and nobody discovered it; I think that that is what you are getting at, is it not, Mr. Wolverton?

Mr. WOLVERTON. Yes.

Mr. MARTIN. I think that I might help you there. The airlines, by taking off the dome and looking at it, learn how many hours it takes to form a deposit of any consequence, and then they schedule the removal of the dome at some lesser time than that and wash it out and put it back on again. That length of time is still quite long, and it is not a real maintenance headache. It is something like every 1,000 hours they must take the dome off and wash it out and put it back on again.

Mr. WOLVERTON. Is that fixation of time the result of experiments or resulting from practical operation?

Mr. MARTIN. Well, the general overhaul practice is to start off with a short period and examine the article, then increase that period as time goes on, and as your experience indicates it may safely be increased, and that is done on the recommendation of the airlines, with the manufacturer's concurrence and with the approval of the CAA. So it is quite a methodical procedure.

Mr. WOLVERTON. Has the Hamilton Co. or the airline or the CAA, either individually or working together, determined a fixed time when there should be an examination or a take-down or a cleaning process, whatever you may term it?

Mr. MARTIN. Yes. For every airline and every propeller, there is a stipulated time, and it varies with the type of airplane and the type of engine and the type of propeller and the type of operation. It is not uniform.

Mr. WOLVERTON. When you speak of type of operation, do you refer to climatic conditions, or otherwise?

Mr. MARTIN. Principally the difference between a transcontinental operation and a transoceanic operation.

Mr. WOLVERTON. Is that based on distance or climatic conditions?

Mr. MARTIN. I think it is probably a difference in cruising conditions that they use. In one case it is relatively high power, and in the other case it is a lower powered condition.

Mr. WOLVERTON. In what way has that experience been put into orders, advice, or what not, as a guide to when this operation should be done?

Mr. MARTIN. As I said, each airline has a formally approved schedule which has been recommended by them and approved by the CAA, usually with our concurrence.

Mr. WOLVERTON. Are such in effect at the present time?

Mr. MARTIN. Yes, sir.

Mr. WOLVERTON. If you have knowledge of the subject, what inspection is made to ascertain that those orders or advice, or whatever character they take, are carried out?

Mr. MARTIN. Well, our service people that visit all of these airlines report to us as to the method employed by the individual airlines, and their compliance with their rules and regulations; and also, the CAA inspectors check up on it.

Mr. WOLVERTON. Now, for the purpose of a further question, by way of illustration, would you give us some idea of the number of hours of operation that you feel, of a particular type, should be the basis for an examination?

Mr. MARTIN. As I have explained to you, that varies.

Mr. WOLVERTON. I understand, but just take any one.

Mr. MARTIN. The variation is of this order: From 600 hours to 2,000 hours.

Mr. WOLVERTON. Now, we will take an operation of 600 hours. What means are adopted by CAA, by your company, or by the airlines, to make certain that the time of operation does not exceed the 600 hours.

Mr. MARTIN. That is principally the airline's operating problem.

Mr. WOLVERTON. It would seem to me from the answers you have given that would probably be the case.

Now, what I am trying to ascertain is this: Is there any oversight, by inspection or otherwise, to make certain that that fixed time, we will say of 600 hours, is not exceeded?

Mr. MARTIN. I am quite certain it is meticulously observed by the regular airlines, from the reports we get back from our field men.

Mr. WOLVERTON. That may be your experience, and prompts you to make the answer that it is meticulously observed; but my question, if you will observe, is: What, if any, independent inspection exists to make certain that it is complied with?

Mr. MARTIN. Mr. Borger, of Pan American, is here, and perhaps he could tell you better than I can what control is exercised by them or on them.

Mr. WOLVERTON. Of course, you understand I do not want you to feel from my questions that I am speaking critically of you or the airlines or anyone. I am just trying, as a member of this committee, to get that information.

Mr. MARTIN. It is an operating problem, and I think you are getting me beyond my department.

Mr. WOLVERTON. I am just endeavoring to find out, even beyond the airlines' representatives' answer, what if any independent outside effort is made to see that the 600-hour limitation, or the 2,000-hour limitation, is not exceeded.

Mr. BORGER. My name is John Borger, of Pan American Airways.

STATEMENT OF JOHN BORGER, REPRESENTING PAN AMERICAN AIRWAYS

Mr. BORGER. In answer to that, sir, the CAA has field maintenance inspectors who check our records. We keep careful records, and all airlines keep records on the time of their propellers and their engines and even as to some parts of the engines. We have an accounting system, if you will, that simply keeps these time records from the individual flight logs; and from time to time it is the practice of the assigned CAA inspector to check our figures; and, as Mr. Martin said, the chances of an airline exceeding it are very, very small.

I have heard of cases of airlines exceeding the limits, and I have also heard of the CAA clamping a fine on for violation, because any exceeding of the allowable limits becomes a violation of what is called the Operations Specifications and Maintenance. That is part of our operating certificate.

Mr. WOLVERTON. Is that operating limit fixed by an order of the CAA, or is it by a general practice or understanding between the CAA and the airlines.

Mr. BORGER. It is submitted by the airline, usually with the concurrence of the manufacturer concerned, and approved by the CAA.

Mr. WOLVERTON. Describe, if you will, the procedure under which such an inspection is made. We will assume that one of your planes is flying around South America, for instance. Now, where would be the spot that such an investigation or inspection would be made?

Mr. BORGER. All at Miami, sir, in that case. Miami is the main maintenance base for all of our operations in Latin America, and as is the case of each airline, they have a main maintenance base. And these hourly limits that are set up are set up not only on the basis of what the particular part of the engine or propeller can go to, but also in accordance with the schedule pattern. And the schedule of the airplane, the routing of the airplane, is controlled so that when the propeller is due to be pulled from the engine, the airplane is routed into Miami at that time, and the propeller taken off the engine and again routed to a special overhaul shop.

Mr. WOLVERTON. Who orders that it will be routed into Miami for that particular purpose? Is it a Government official who makes the inspection, or is it the general practice of the operating company to do it?

Mr. BORGER. It is a function of part of the operating company, and we have a scheduling group that schedules the airplane just that way.

Mr. WOLVERTON. So that when you feel that it is time for the inspection, you order the plane in for that purpose?

Mr. BORGER. When the records from the flight logs—and the flight logs, for instance, on any airplane that is flying anywhere in the world are radioed in to the main base—when the records indicate that that airplane is aproaching its time limit, the airplane is so scheduled that it will come into Miami for an engine change or a propeller change. Obviously, if a plane, let us say we have got a 1,200 engine change period authorized, and if the plane has 1,100 hours and it is in Miami, it is scheduled out of Miami so that it will not exceed 100 hours before it comes back in.

Mr. WOLVERTON. What if any information or knowledge does the inspector, for instance, at Miami, know, other than the records that you submit to him, as to how much mileage that plane has had, and whether an examination is necessary?

Mr. BORGER. He has free access to all of our flight logs, sir.

Mr. WOLVERTON. He would then, have to watch what planes were coming in, and where they had been, and take it upon himself to make an examination of those records to ascertain whether the time had arrived for that examination?

Mr. BORGER. Well, we keep individual logbooks on each airplane, and the time that that airplane acquires is recorded as the reports come in from the actual flight operations. I would presume if I were the inspector, that is what I would be watching. I would be watching the logbooks on each individual airplane.

Mr. WOLVERTON. I did not mean to shut you off, if you had not finished. Would it be possible for an inspection to be made and the condition ascertained by the inspector, without it having been called to his attention by your company as to the full use of the operating

time? In other words, is there any inspection that can be made to ascertain whether there is corrosion present, by an inspector; and if so, do the inspectors do that, or do they depend upon you or your company or other companies telling them when the time has elapsed that there should be an inspection?

Mr. BORGER. Well, for instance, in the first place, the time limits are established on the basis of mutual inspection. In other words, as Mr. Martin said, it is the conventional practice to start out with a low time figure when we get a new airplane or a new engine or a new propeller. We start out with low hourly limits, and then gradually we extend, as our experience indicates that such extensions are warranted.

Now, the extensions are usually based upon the joint inspection by the airline people, by the CAA, and the manufacturer concerned; usually they call the people in and say, "We are going to ask for an extension on this, and we think it is pretty good and we would like you to take a look at it and see if you agree with us."

There have been times when we have been refused such extensions. Usually it is our practice not to ask for such an extension unless we sincerely believe that an approval is warranted.

Mr. WOLVERTON. Would it be practical for an inspection to be made if and when the Government desired to do so through its inspection service, independent, separate and apart from the action of the operating company in calling to their attention that the limit has been reached? In other words, do I make it plain? Is it practicable to expect or to require that the Government inspection service should make this inspection regardless of what your records may show as to the amount of time that the plane has been operated?

Mr. BORGER. Yes, sir, I think that the CAA inspector, if he desires, could call for special inspections from time to time.

Mr. WOLVERTON. I appreciate that he could do it. I am asking you whether that is practicable; and if so, for what reason?

Mr. BORGER. It is not too practical. In the first place, it is not practical at a lot of stations other than the main base, for example, to pull a prop dome. It effects delay of the schedule at a line station. And furthermore, you require the special tools, although we usually have tools at every station to look at a prop dome.

Mr. WOLVERTON. I assume it would have to be made at a time and place where the necessasry facilities would be available.

In asking these questions about the propeller, it is not that I have in my own mind the thought that the propeller takes preeminence as a cause for accidents. It is merely to get at the whole question of inspection by a Government agent, whether it be the propeller, whether it be the engine, whether it be the governors, or whether it be the ducts. It is really corrosion where it could occur, and that is my basic thought, and not particularly making it seem important with reference to the propellers.

Mr. MARTIN. I think the important thing in there is the periodic schedule inspections, where the CAA inspectors are there to look at the parts as they are taken down. You soon develop an ability to look at a propeller and say, "Well, that is in good shape, and it hasn't been used too long, and it isn't full of sludge and it is in good condition." So that their presence in the overhaul base provides a great deal of security and background to know whether the period is too

long, or too short, or just right, or to form a judgment and continue to operate on it.

Mr. KEARNS. Sir, I would offer one point there, and that is this: At inspection you rarely find anything wrong. What you do at inspection is, in effect, to refurbish the pieces and put in new seals, if necessary, or clean out passages if necessary, so that when you inspect, you don't find a black or a white situation; you simply make sure that there is nothing particularly wrong, and return the piece of machinery, whatever it is, engine or propeller, to a substantially fresh condition.

Mr. WOLVERTON. Of course, I do not want to take any more time—I have taken too much already—but what I have in my own mind is the thought that all operations do not have back of them the facilities that we know to be back of Pan American, for instance, or some of these others and yet, they carry passengers. And this committee is interested from the standpoint of safety. I am interested from the over-all question of inspection to provide as high a degree of safety as possible for the traveling public.

Mr. BORGER. Sir, if I may say so, it has been my own experience in going around and viewing the maintenance facilities and the equipment and personnel of the other scheduled airlines, that those practices that I described are much the same, almost exactly the same, in all of the airlines.

There is one other point I would like to add. First, with regard to Mr. Kearns' remark, if we are finding on inspection too many things wrong, that means our time limit is too high, and we would reduce our time. We have had occasion to do that.

Secondly, too many inspections, if we start taking some of the parts of the engine apart that you see on these diagrams, we get into a condition that we in the airlines call "tinkeritis," and we can actually be detrimental to safety by fooling with it.

Mr. WOLVERTON. I have had that idea about my car.

Mr. BORGER. It is the same thing. And we therefore develop, or try to develop, methods of checks and tests, where you see the ground run-up, and every take-off you have a very brief ground run-up to check the integrity of the ignition system just before take-off.

Periodically we have much more extensive ground run-ups, where all of the instruments are carefully observed and the readings are recorded and checked against previous readings. We try to do as much as possible; and that is why you see so many instruments in the cockpit of an airplane—to get checks on how the engine and the propeller and other devices are functioning. We do that without taking the engine apart.

You mentioned before about the lead accumulation or the sludge accumulation in the dome of the propeller. That is a condition we are aware of. If the propeller became sluggish on that, we would have a squawk from the pilot or the flight engineer long before we had any trouble with that propeller. It bothers a pilot to have a sluggish prop.

Mr. WOLVERTON. I am going to conclude with this statement: That when it came to our attention that there had been such a strenuous objection made by the CAA and the CAB and the ATA, and Pratt & Whitney and other interested parties, to the issuance of order No. 4, with a detailed statement of the conditions that could arise as a result of the increased quality of tetraethyl lead, it occurred to me as I read much of that correspondence that was submitted to me by the

Secretary of the Interior, it was a mighty dangerous thing because of these conditions that could arise as a result of corrosion.

Now, naturally, a layman would think from the standpoint that if that can happen in so many different ways, as was expressed in those statements that were made, then naturally I think in terms of what inspection is there, either by the operating companies, by Government officials, or otherwise, to make certain that those conditions do not exist which the statements indicated had a direct bearing on safety.

That is all that I have to say, Mr. Chairman.

Mr. HINSHAW. Mr. Chairman, I would like to inquire of any of these gentlemen whether, upon the issuance of this Petroleum Administration for Defense Order No. 4, there was any automatic shortening of the time between inspections and overhauls on propellers and propeller hubs and mechanisms?

Mr. MARTIN. I don't know the answer on that.

Mr. HINSHAW. Does anyone know the answer?

Mr. BORGER. We arbitrarily set up to have the time to pull the dome for an inspection.

Mr. HINSHAW. You pull it twice as often?

Mr. BORGER. Yes, sir. That is just strictly arbitrary until we find out.

Mr. HINSHAW. That was your own order, was it?

Mr. BORGER. Yes, sir.

Mr. HINSHAW. No one else told you to do it?

Mr. BORGER. No, sir.

Mr. HINSHAW. Presumably, in the burning of high lead content gasoline, a certain amount of that lead collects in the engine oil in the form of sludge, is that correct?

Mr. MARTIN. We get a sludge deposit in the dome, which is a good centrifugal separator, as a matter of fact. It develops a centrifugal field which throws the heavier lead out against this other surface, removing some of the lead content from the engine oil.

Mr. HINSHAW. So you actually have a lead separator in the dome?

Mr. MARTIN. That is right.

Mr. HINSHAW. Is there any other place in the propeller hub that it can collect?

Mr. MARTIN. We have never observed it in any serious degree anywhere else except against the outer shell. Apparently, the centrifugal field throws it out there as that is the furthermost portion of the hub mechanism.

Mr. HINSHAW. Does it form against the shell of the hub as a deposit of some solid nature, or is it loose?

Mr. MARTIN. It is quite sticky and gummy.

Mr. HINSHAW. And it adheres to the dome, then?

Mr. MARTIN. Yes.

Mr. HINSHAW. That same oil passes through the governor, does it not? It passes through a number of valve mechanisms, I take it. Offhand, about how many valves does it pass through? How many valves are there in the governor?

Mr. MARTIN. There is one metering valve.

Mr. KEARNS. One main metering valve, and a by-pass valve, so there are really two.

I can point that out to you. This governor comprises a gear-type pump which takes in the oil at 75 pounds per square inch pressure

and pumps it up to 200 or 300; that high-pressure oil is then metered by a pilot valve which translates inside the sleeve—you have to have a very good light to see it—but the position of that valve with respect to certain parts controls the flow of oil out to the propeller. The amount of oil coming from this pump that is not transmitted to the propeller is by-passed back to the engine system by a pressure regulating valve.

Mr. MARTIN. I would like to call your attention to something that has been done in the governor design aimed at preventing the kind of trouble I think you have in mind.

Mr. HINSHAW. I have not mentioned any trouble.

Mr. MARTIN. I read the question you asked Bill Littlewood.

The pilot valve and the sleeve in which it operates are driven with respect to each other, and they actually operate by a translating motion, but they are driven with a rotary motion, so that it is self-cleaning. Wih a power drive turning it in a rotary sense, there is no friction to transitory motion. That was done deliberately to reduce friction in the governing system.

Mr. HINSHAW. That happens, however, before the centrifugal cleaning action takes place in the hub, does it not?

Mr. MARTIN. Not entirely. In this type of system, the engine only supplies make-up oil to the propeller. Actually, the propeller oil system, except for leakage, is a tight system; so the oil that has been out here once and had the lead centrifuged out of it, goes back into the governor and thus is pumped up and comes back on the other side. Thus the only addition of oil to the system is to make up leakages. So the majority of the oil that goes to the governor has been out here before.

Mr. HINSHAW. If that is a closed system, then the deposits in the propeller hub ought to be very slight, indeed.

Mr. Martin. It increases the length of time that it takes to get a serious deposit. As I say, there is fresh leakage oil added all of the time, and a small amount relative to the amount the pump is pumping, but the order is probably 2 percent, or something of that sort, that is fresh supplied by the engine, and 98 percent recirculated.

Mr. HINSHAW. Then what makes a propeller governor go haywire?

Mr. MARTIN. Well, that is a hard question to answer, without knowing exactly what you are talking about, and I am not sure that I could then. But to answer that as a generalization——

Mr. HINSHAW. It so happens that certain members of this committee were on an airplane not long ago——

Mr. MARTIN. What kind of an airplane was it?

Mr. HINSHAW. A DC–3, in this case—in which the report was that the propeller governor had gone wrong and permitted an over-revving of the propeller, and so the engine had to be shut off and the propeller feathered. It was quite a unique experience for me, and I imagine the rest of them, flying over Chile with one propeller in a two-engine airplane.

I had no idea what went wrong in the propeller governor, but that is what was reported to me; and I have since read reports concerning propeller governors which indicate that they do not always function perfectly.

Mr. MARTIN. That is the single-acting governor system in a DC–3. The most likely explanation for this happening is oil starvation.

Mr. HINSHAW. Let me ask this: On a DC–6, does the record show that propeller governors have ever malfunctioned?

Mr. MARTIN. Yes, sir.

Mr. HINSHAW. From what cause?

Mr. MARTIN. There are several that I can recall. One concerns a particular airline maintenance man who had an idea that the governor should be fitted up tighter than we think, and they fitted up some that way. That has been corrected and he no longer does it, but it did happen. That is the only specific instance I can think of at the moment.

Mr. HINSHAW. Has it ever happened that any foreign material lodged under a governor valve and prevented the seating of the valve?

Mr. MARTIN. Not in the pilot valve, to the best of my knowledge.

Mr. HINSHAW. Or any other valve?

Mr. MARTIN. I have no specific knowledge of it ever happening.

Mr. HINSHAW. That has been mentioned as a possibility to this committee, and that is why I asked the question.

Mr. MARTIN. In general, as I pointed out to you, the scheme of driving those two parts is very effective in eliminating any detrimental effect. In fact, we have run governors, feeding them shavings and chips deliberately, and used contaminated oil, in an effort to find out what would happen, and we have done it to the point it was so bad that it literally chewed up the gear pockets, but it never affected the pilot-valve action.

Mr. HINSHAW. Until, of course, the gears ceased to function?

Mr. MARTIN. Yes.

Mr. HINSHAW. Then you think that this governor will not malfunction under any circumstances?

Mr. MARTIN. No, sir; I wouldn't say that. I explained to you a minute ago that it had to be fitted up properly.

Mr. HINSHAW. Well, you say that they have malfunctioned?

Mr. MARTIN. I would say this, Mr. Hinshaw: I think the hundreds of thousands of these governors that have flown 20 or 25 thousand hours have proven beyond any reasonable doubt that, given proper maintenance procedures, it is a very reliable and practical device.

Mr. HINSHAW. In other words, you do not believe that if that device is properly maintained, it can malfunction?

Mr. MARTIN. I think the probability is very small.

Mr. HINSHAW. Well, it is, of course, those very small probabilities that sometimes cause the trouble, and if anybody were to have guessed that three airplanes would have been dumped into the middle of Elizabeth, N. J., inside of a couple of months, and nowhere else around the place, we might say that those possibilities were so remote as not to worry about it. But we have to worry.

Mr. MARTIN. Having an engineering background as do you, I do not like to ever say that anything is absolute, because I do not believe it.

Mr. HINSHAW. I take it that this other gentleman is going to discuss the conditions of the propellers, and so forth, that were found in these two accidents that we had?

Mr. MARTIN. Yes, sir.

Mr. HINSHAW. And I gathered from you that there is no possibility, within any foreseeable limits, of a malfunctioning occurring in the governor?

Mr. MARTIN. I think that is correct.

Mr. HINSHAW. Now, what about in the pump that supplies the reversing pressures?

Mr. MARTIN. Actually, you see two sources of pressure for reversing: one the governor, and one this electric pump. And either one of them is capable of reversing the propeller.

Mr. HINSHAW. I understand that the CAA either has or intends to call the propeller manufacturers together with certain representatives of their own, to go over the entire mechanism, all of the electrical hook-ups, and everything else.

Mr. MARTIN. That is now being done.

Mr. HINSHAW. To find out just what might happen that has not already happened; is that correct?

Mr. MARTIN. Some of our engineering people are on this task group on the west coast now, visiting the airplane companies and the airlines out there. We have had at least one meeting with the power-plant and propeller people in Washington, looking into the propeller-mechanism problem.

Mr. HINSHAW. Well, this committee has been furnished with a list of 14 inadvertent reversings of propellers, inadvertent reversing of propellers, and have noted the actions that were taken as the result of these inadvertent reversings; and, of course, it is natural to wonder whether or not all of the foreseeable causes have been taken care of.

All of the experienced causes have been taken care of, to the best of the ability of those who are engaged in the operation or the manufacture of the propellers. We are naturally very much interested in what may have occurred in two of the three accidents in Elizabeth, N. J., as in connection with the accident No. 2 which occurred to a Convair 240. The path of the falling airplane from the radar-scope indications would lead one to believe that it could have fallen in that path due to either a malfunctioning engine with a nonfeathered propeller, or to a reversed propeller, although the engine and propeller were found to be in a position—I believe the blade angle was 41 degrees on that side, when it was dug out of the cellar.

I guess that is one of the things that your friend is going to discuss. Perhaps we have had enough of this, gentlemen.

Mr. BECKWORTH. Mr. Martin, which one of the men is going to discuss the reversed pitch, and so forth?

Mr. MARTIN. Well, either way you like. Mr. Lambeck has personally been in on the investigation of the propellers from these last two Elizabeth accidents, as we all have, but he has been more intimately concerned with it.

Mr. BECKWORTH. That we might have an idea—and it may already have been stated as to who else we will hear; I was not here at the beginning, and I am very sorry for it—would you mind stating what else is on the program in the way of the information that we are to have? In other words, you will talk, and then who else?

Mr. MOOBERRY. We have four people here from Pratt & Whitney.

Mr. BECKWORTH. Will each of the four wish to make an explanation, or will there be just one?

Mr. MOOBERRY. We will have one, and then there will be others who will answer questions.

Mr. BECKWORTH. Will you go ahead and give us a statement as to what you may have found in reference to the two airplanes?

STATEMENT OF RAYMOND P. LAMBECK, CHIEF PRODUCT ENGINEER, HAMILTON STANDARD PROPELLER CO.

Mr. LAMBECK. My name is Raymond P. Lambeck.

Mr. BECKWORTH. And your position?

Mr. LAMBECK. Chief product engineer, Hamilton Standard.

I participated in the examination of the main propeller components from both the Convair at Elizabeth, N. J., crash, and the National Air Lines DC–6.

In the case of the Convair propellers, as I believe you mentioned, Mr. Hinshaw mentioned, both propellers were found in positive pitch at the time they were located among the wreckage.

In a crash of that type, almost the entire aircraft structure and most of the general hydraulic system, wiring system, and fuel system, are completely destroyed, so about the only things that are still available for examination are a few of the more durable parts, like the propeller hub, and the propeller governors, and parts of the engine.

It is my understanding that the general examination of the powerplant parts, including the engines and propellers and propeller components, showed no faults. I know I participated in examination of the propeller governors, and in parts of the propeller hub.

All of the parts that were not specifically damaged by the crash itself in quite obvious fashion were still in workable condition. There was some mention of the fact that the propeller-blade angles were different as the two propeller hubs were found. That is not particularly surprising, We have had many cases of propeller hubs being involved in anything from wheels-up landings to crashes, and it is quite common for the propeller-blade angles to change at the time the propeller hits something. The impact blows on the leading edge of the propeller blade have a tendency to turn the blade to some angle other than the one at which it was originally operating, and it is quite easy for it to move the piston within the pitch-changing mechanism to another location.

We did, as a matter of fact, at one time take some high-speed photographs of a propeller when it was undergoing impact blows in running it through at that time a snowbank, and it showed some very severe turning of the propeller blades. In that test, in the manner in which the impact blows were applied, the turning tendency was toward a higher pitch, and it turned very rapidly and very severely in that direction. And so, it is not greatly surprising that in the course of crashing, the propellers might wind up at some setting other than their initial setting. They are not locked, in other words, at any specific angle, but are held at a proper governing angle by the action of the governor, and at the time of the crash may be turned to another angle.

In summary, in other words, we have found no indication that the propellers were in other than a normal blade angle at the time that the airplane crashed. And the lack of availability of other parts of the system does not allow for any conclusion as to its condition.

Mr. BECKWORTH. What kind of consideration have you given to the possibility that perhaps one of the propellers reversed and the pilot was able to turn some gadget and put it back in the place where it should be? I suppose, first, there would not be any positive proof of that occurrence, and there would be no way of doing it.

Mr. LAMBECK. If that had occurred, there would be no distinct way to determine that it had. All that it is possible to go by is the final condition of the parts; and so far as the parts of the propeller hub and governing mechanisms are concerned, there was no fault in them that would have contributed toward putting a propeller in the reverse pitch position. If there was some other fault in some of the other parts of the system, for example in the airplane installation outside of these particular problems, there would be no way to determine it.

It does seem, however, a bit unlikely, considering the timing sequence of the accident, that such a thing could have occurred. There was a fairly good time schedule established between the time when he appeared to be in good flying condition, and the time when he crashed, and it was a relatively short period, on the order of 20 seconds, and it would have required a fairly fine combination of actions to have taken place in order to have come out exactly the way they did, and leave him again with power on in positive pitch at the time the airplane hit.

Mr. BECKWORTH. With your wealth of technical knowledge about propellers reversing, would you state what are two or three of the primary causes why a propeller would inadvertently reverse?

Mr. LAMBECK. Well, the propeller is provided with an attachment which will receive an electrical signal. When it receives a proper electrical signal, it transmits the hydraulic pressure necessary to release the normal low take-off pitch and allow the propeller to go into the negative range, that is, the reverse-blade angle. Anything that would transmit that type of signal to the propeller could cause it to go into reverse pitch.

There have been no instances recorded of a power-on-flight reversal due to any means except providing that type of signal to the solenoid valve on the propeller governor. There might be any of a great variety of individual faults within the electrical system that could conceivably cause such a signal to be transmitted, but primarily they classify as only two things: One would be moving the throttle for the individual engine into the reverse position in flight. That is normally prevented by the action of the aircraft manufacturer-provided safety switch, which prevents the throttle being moved into the reverse position unless the airplane is on the ground. But it is conceivable that due to some misrigging or some fault in that, it would be possible to move the throttle into reverse position in flight, and that has happened.

It is also conceivable that some other source of power might be applied to the electrical lead to this solenoid valve. That could in turn cause the propeller to go to reverse pitch in flight. There are protections against that type of fault, also, in the commercial installation.

Mr. MARTIN. One of the instances you named was clearly traced to that one, and that was found.

Mr. HINSHAW. That happened in Chicago, I believe.

Mr. MARTIN. Yes, sir.

Mr. HINSHAW. But there was no accident that resulted.

Mr. LAMBECK. There was an instance of on-the-ground reversal in Chicago, due to an electrical fault of that type, where power was inadvertently applied to the signaling lead to the reverse solenoid valve on the propeller, and it led to a reversal.

Mr. MARTIN. This committee action of the CAA that you referred to, is paying particular attention to that problem in their survey of aircraft.

Mr. HINSHAW. That is our understanding.

Now, I do not believe—pardon me, I am not asking questions, you are. Go ahead.

Mr. BECKWORTH. Go ahead. That is all that I had at the moment.

Mr. HINSHAW. I do not believe that the report of the CAB investigators has been released yet on the possible or probable causes in connection with either of these latter two accidents at Elizabeth, N. J., but it has occurred to the committee that if it is possible in some way to have an inadvertent reversal, that of course it might have likewise been possible for the pilot, upon discovery of this reversal, to have recovered the forward pitch of the propeller before landing. Obviously, if anything such as inadvertent reversal occurred in flight, his first object would be to change that pitch. How would he go about it?

Mr. LAMBECK. That might depend to some extent upon what action he had taken just prior to his finding that a propeller had gone to reverse pitch. For example, the pilots are very familiar with the fact that if you pull the throttle past the detent, it will be in the reverse position and it will call for the propeller to go to reverse pitch. So conceivably if a pilot in flight pulled a throttle down against the stop and the propeller reversed, he would realize that he had somehow closed his reversing switches and would move the throttle forward in order to bring the propeller back out of reverse. That has happened in a number of recorded cases, where the pilot in closing the throttle did reverse the propeller because of some fault in the throttle-stop arrangement or in the rigging of the switches. Then he moved the throttle forward and the propeller did reverse, and he continued with his landing.

If, on the other hand, the reversal was caused by power being applied by accident, through some electrical fault, to the reversing solenoid, it could occur when he had taken no action whatever. In that case, he would not be inclined to move the throttles, I do not believe, and he would probably push the feathering button in an effort to feather from the reverse position.

Mr. MARTIN. In which case, the propeller——

Mr. LAMBECK. If the power had persisted to the solenoid valve, the propeller would have been found, in the Convair 240 accident, still in the reverse position, because that action would not bring about an unreversal.

Mr. HINSHAW. I am sure you can understand how it is difficult for laymen such as we are to comprehend all of the technical facts that may be involved in these things, but inquiry of pilots and some little experience in flying has indicated that occasionally a governor has stuck or required to be loosened somehow, and at that point a pilot is likely to maneuver the throttles in an attempt to unstick the governor.

If there were an inadvertent reversal in flight, would that not be one of his objects in the realization that it might be due to some malfunctioning in connection with the governor, or would he take any action with respect to the props?

Mr. LAMBECK. I doubt he would do anything to the throttles unless he had just closed them, because the pilots are very familiar with the fact that that action is the same action that they take in preparing for a normal reversal, and they first close the throttles and then pull them past detent into the reverse position.

Mr. HINSHAW. In connection with this Convair accident, what was your observation concerning the propellers themselves as they were found? Did you have the feeling that both propellers were operating under power, or that perhaps one of them was not operating under full power?

Mr. LAMBECK. It is not possible to tell that clearly from examining the parts. The propellers would be rotating at pretty much the same speed whether they were operating under power or under control of the governor, or whether they were windmilling. Since they are operating at about the same speed, the nature of the damage that they would sustain in a crash would be pretty much the same. So that it is not very obvious from examining the propellers whether they were power-off or power-on.

However, they were in the positive pitch range, and in a position to be operating under power; and, as I understand it, the examination of the engines showed no fault in the primary parts of the power plant. So that, unless there was a fault somewhere else in the power-plant system, such as, for example, the fuel system, there would be no reason to expect them to be operating in anything other than positive power.

Mr. HINSHAW. My reason for asking that question was, if my memory serves me correctly, the propellers on one engine were rather bent, and on the other one they were shattered, and that gave me the idea that there was probably a difference in the two-engine operations at the time that it landed.

Mr. LAMBECK. The two propellers hit entirely different things. The airplane hit half on a building and half off, and exactly what parts of the building the right-hand propeller hit are not too clear, but certainly it was a different type of substance than whatever the left propeller hit. So that you could very well have different degrees of damage on the two propellers, even though they were both rotating at the same speed and under the same amount of power.

Mr. HINSHAW. Let me ask you one final question, then. An airplane coming in for a landing at a speed of approximately 130 miles an hour, which I presume is about the average speed, the approach speed on an ILS beam for a Convair, if there were a malfunctioning which would cause either a flattening of the propeller or an inadvertent reversal, would you say that the forward speed of the airplane would be reduced to such a point that it would stall?

Mr. LAMBECK. Actually, that is something that would need to be answered by the airplane manufacturers or airlines, who have much more knowledge of the detailed flight characteristics of the airplane than we do. I can say only this: that there have been two or three cases which I can recall of either a Convair 240 or some other airplane having a propeller in reverse position in flight with the power cut rather than power on, and it was still maneuverable. But where it goes beyond that, I am not sure.

Mr. HINSHAW. That, in full flight, would be something about 250 miles an hour?

Mr. LAMBECK. At about the same air speed, at low air speed.

Mr. HINSHAW. That occurred on the border of an airfield, and I think I remember the case.

Mr. LAMBECK. Yes. There was one case, I believe, that was on the list of 14 incidents that you mentioned, which was on a Convair airplane at Tulsa.

Mr. HINSHAW. And on the border of the airport, barely off the ground, coming in for a landing.

Mr. LAMBECK. That is right.

Mr. HINSHAW. That is all that I have, Mr. Chairman.

Mr. CARLYLE. I would like to ask one question.

Did I understand you to say that after a crash such as these at Elizabeth, N. J., it would be almost impossible to examine the propeller or the components of the propeller and to gain definite and satisfactory information as to what the position of the propeller was prior to the crash?

Mr. LAMBECK. You can get the approximate information as to the angles of the propeller blades at the instant of the crash; but, so far as their operating condition 1 minute before, or 2 minutes before, or even 10 seconds before, there is no positive way of telling where they might have been.

Mr. HINSHAW. Mr. Chairman, I asked only about this second accident at Elizabeth. In the third accident, the reports were that one engine had failed, its propeller had been feathered, and that a second engine was found to have had its propeller in a reverse-pitch position upon landing. What explanation is there given of that?

Mr. LAMBECK. We examined the propeller parts and the governor parts for both the No. 3 and No. 4 engines, which were the ones in question; also, of course, the No. 1 and No. 2 engines, but in very detailed fashion all of the propeller components from the No. 3 and No. 4 engines of that airplane. There again, an examination of No. 4 showed the propeller and governor were in satisfactory condition. The propeller blades had apparently been in the full-feathered position at the time the airplane crashed, with the engine stopped. And there is supplementary evidence from within the engine that there was no rotation of that engine at the time of the crash. That would indicate, presumably, a normally feathered propeller and a shut-down engine.

On the No. 3 nacelle, the propeller at the time it was found, immediately after the crash, was found to have the blades turned to the full reverse position. Our examination of the propeller parts and the governor parts from that nacelle again indicated no fault in any of the mechanical pieces.

We examined them further, the parts further, in order to find any other indications that might account for the angle of the propeller blades, and we did find two things, or more than two things, and I would like to mention two things particularly which I think illustrate clearly the nature of our examination.

I have photographs that I would like to show you to illustrate these things that we looked at.

One of them is a photograph of the three blades. This photograph is taken looking in a direction facing the propeller, looking rearward, facing the propeller, with the stub ends of the blades turned to what would correspond to the full reverse position.

We find that, in the case of two of the blades, the fractures are of a type which would be caused by running into some barrier, or into the ground, with the blades turned to some low pitch or flat pitch or reverse pitch, or anything in that general range; but, in the third case, the fracture is of a type that would be caused, if you assume the propeller is in full reverse pitch, by a blow from the rear of the propeller, which is physically impossible with an airplane moving forward. If you turn that blade, however, to the positive low-pitch position, then the direction of loading that caused that fracture corresponds to a load applied against the leading edge of the blade in a rotating propeller.

It gives a good indication that the propeller must have been at about that angle at the instant that the airplane crashed.

We looked at the forward parts of the propeller, and I have a picture here which shows an indentation, very deep, in the end of the piston sleeve in the dome, which engages the levers of the positive low-pitch mechanism, and it is these levers which keep the propeller from going into reverse pitch unless it receives a proper reversing signal from the control signal. The presence of three deep indentations of the type illustrated in this photograph indicates a very extreme load placed upon the mechanism at some time. It is very much different from the results of the normal wear which is encountered in service.

We ran a series of tests to determine what sort of load it would take to produce an indentation of that type, and we found that the load required was at least 66,000 pounds, and possibly as high as 80,000 pounds; at the lower of those values we got very slight impressions, and at the 80,000-pound value we got heavier impressions.

In trying to determine whether it is possible to get that amount of load in flight, we considered the most severe case of loading that could conceivably occur, and it amounted to only 50,000 pounds, which was somewhat lower than the amount we found necessary to produce impressions of that type.

It is possible, however, in turning the blades so as to shear them or fracture them, to produce higher loads than can be produced by any flight loading.

We reached the conclusion, from the examination of evidence of this type—and these are samples—that the propeller was actually in positive pitch against the low-pitch stops at the instant of the crash, but that the impact of the crash forced the stops to release and drove the propeller into the reverse range.

As supplementary to those tests, we ran additional tests to determine whether it is possible to release the stops due to any type of impact load which you can get in flight, due to, for example, suddenly interrupting the supply of oil to the governors so as to allow the propeller blades to come to a low-pitch position against the low-pitch stops. The amount of loading there is very much smaller than the amount that would produce these indentations, and it is almost a small fraction of that, and it produces no effect at all of releasing the low-pitch stops.

On the basis of the examination of these parts, we feel that the propeller at the time of the crash was in the positive low-pitch position. There is some indication that it was possibly windmilling in that position rather than power-on, because there is no indication of

impact marks at higher blade angles than positive low pitch; that is, such as you might expect if it was a power-on condition.

That indicates, in other words, that the airplane probably had No. 4 propeller feathered at the time of the crash, and No. 3 propeller windmilling with power off, so that there was no power on the right-hand side of the airplane, and whatever drag you would get from one windmilling propeller. In fact, witnesses' statements seemed to indicate that even the No. 4 propeller was windmilling for at least a part of the flight, and perhaps for the major portion of the time when the airplane was in trouble. That would be an even greater amount of drag on the right-hand side.

Mr. BECKWORTH. As you made these studies and more or less came to the conclusion that you have expressed here this afternoon, did CAB, through its representatives, accompany you, and did you all discuss these various things that you have referred to, or not?

Mr. LAMBECK. We examined the propellers in cooperation with the CAB at the time of the initial investigation. We brought these various indications to their attention at the time as being things which were unusual, in our experience, and which we felt required some explanation and some study.

We conducted tests to determine what load it would take, for example, to produce impressions of this type, independently of the CAB, and have reported in summary what our findings are, and intend to send them a complete written report for their use in finally determining the true nature of this accident.

Mr. BECKWORTH. What I have in mind specifically is this: As you studied the pitch of a given propeller and discussed the normalcy of it or the abnormalcy of it, was there a CAB man standing there righ near you asking questions, or perhaps you asking him a question and you making a comment and he likewise making a comment? Did that kind of thing take place in general, or not?

Mr. LAMBECK. If I understand you correctly; it did. We worked, as I said, cooperatively in examining the parts, and making note of all of the indications; and particularly noting anything which appeared unusual.

Based on those discussions with the CAB, and at their request, we continued with test work in order to determine what type of loading could produce these marks, and in order to try to assist in more completely determining the basic reasons for the crash of the airplane.

Mr. BECKWORTH. Has your work with reference to these crashes been about completed?

Mr. LAMBECK. Yes; we have.

Mr. BECKWORTH. And the conclusions that you have reached, I assume, have been written up and either have already been transmitted to CAB or soon will be?

Mr. LAMBECK. We have at the moment given them a summary report of the factual findings, together with our comments as to the conclusions we would draw from them; and we plan to make a more complete written report on that.

Mr. BECKWORTH. After you point out your conclusions, do you then go into the realm of probabilities, or not?

Mr. LAMBECK. It would undoubtedly be necessary to do so in order to get a complete explanation for the entire incident. I do not believe

that we would plan to go to quite that extent in this propeller report which we plan to submit to them.

Mr. HINSHAW. I would assume from the statement just made that No. 4 engine was likewise not operating at the time of the crash, in your opinion; is that correct?

Mr. LAMBECK. That is correct.

Mr. HINSHAW. There was a double engine failure, and one propeller windmilling, which would cause a certain amount of drag on that side?

Mr. LAMBECK. That is correct.

Mr. HINSHAW. It would no doubt be an improper question to inquire of you as to whether or not the airplane would be flyable at the speed at which both engines went dead, and, if so, at what rate of climb or descent. That, I take it, is not within the realm of your division.

Mr. LAMBECK. I am not sufficiently familiar with the airplane to be able to answer that conclusively.

Mr. HINSHAW. Obviously, it is designed to take off with three engines operating, and to continue its flight. Now, whether or not it would continue with two engines and one propeller windmilling is another subject.

Mr. MARTIN. Mr. Lambeck said one engine was windmilling, in his opinion, and the other one was feathered. Now, I do not think that he meant to go from there and say that there was a double power-plant failure. Why that propeller was feathered, we do not know. The pilot might have feathered it, and the propeller might have feathered because something was wrong with it that we have not been able to find. But I just wanted to make it clear that we have not concluded that two engines failed, and we have no basis for that.

Mr. HINSHAW. There were two engines inoperative?

Mr. LAMBECK. Yes, and the reason not determined. In a crash of this type, which usually involves quite complete destruction of the aircraft and considerable fire, only the more durable parts of the system are available for examination, and those generally include the engines and the propellers. But they generally do not include various other parts of the power-plant system installed in the aircraft, like the fuel system and like the wiring and like a number of other things of that type.

Mr. WOLVERTON. Might I ask one question, please? Going back to the demonstration that was made on the exhibit that we have here, we were shown how the propeller could be feathered or how it could be reversed, and is that operation necessary individually with each propeller, or does the thing operate automatically on three or four or whatever the number of propellers might be?

Mr. LAMBECK. In this particular airplane it is necessary for the pilot to select the proper push button and push it in order to start the feathering operation. He must determine which propeller needs to be feathered, and then push the proper button; and there is one push button and one feathering button for each propeller.

Incidentally, in this case, it would not have been the pilot; as I understand it, the No. 3 and No. 4 feathering buttons are in almost all cases out of reach of the pilot in the DC–6, and he asks the copilot to push the proper button.

Mr. WOLVERTON. Would the fact that one of them was feathered, as you term it, and one of them in reverse, and one windmilling, indicate——

Mr. HINSHAW. That is not quite it. There was one of them feathered and one of them in low pitch, and the other two were operating.

Mr. WOLVERTON. I thought he said one was in reverse.

Mr. LAMBECK. One was found after the crash in reverse, but our examination indicates it was actually in the positive take-off low-pitch position at the time of the crash, and was knocked into the reverse position by the impact.

Mr. WOLVERTON. Was there anything to indicate that the pilot had proceeded to either feather or to reverse his engines and had only been able to actually operate one or two of them before the accident happened?

Mr. LAMBECK. There would be no very clear way to tell. The pilot's operating procedure includes, besides pushing the push button to feather a propeller, turning various switches in the cockpit in order to shut that power plant down completely. Those switches were so damaged and disarranged by the crash itself that their positions were no longer considered significant.

For example, the switches on No. 1 and No. 2 engines were not in any reasonable pattern, but it is quite apparent that those two engines were undoubtedly operating properly. So it is logical to draw from that a conclusion that you cannot depend upon the location of the switches of the No. 3 and No. 4, either.

Mr. WOLVERTON. Was there anything about either or any of these accidents—and by the way, I might ask, Did you examine the propellers in all three accidents that happened?

Mr. LAMBECK. In only the second and third, which we have discussed here.

Mr. WOLVERTON. Now, in that accident where the airplane came across the guide path where the controller had been telling him that he was too far one way and to turn his plane, and he turned it and instead of stopping or going along the guide path he went right through the guide path and came across and took what seemed to some to be a precipitous drop, did the condition of the propellers in that case indicate that that unusual course that the pilot took could have happened as a result of any propeller failure?

Mr. LAMBECK. We found no mechanical difficulties in either the propellers or the governors from that airplane that would account for their failing to govern normally; and, as I have said, the propellers were found in the positive pitch, with indications they received impacts at several angles in the positive pitch range in the course of the crash, but no indications that they were at any time in reverse pitch from the time of impact onward.

Mr. WOLVERTON. Would it have been possible for anything to have happened to those propellers that would have caused the plane to take such a changed position in flight as was indicated by the course that that plane took before it actually dropped into the ground?

Mr. LAMBECK. Well, if there was some fault in the control system in the airplane, it would not be possible to determine it because of the extent of damage to the aircraft. But as I said, there was no fault found in the propeller which would indicate that there was any reason for it to be other than governing in a normal fashion.

Mr. WOLVERTON. Can you vizualize any difficulty that may have arisen that would have caused a pilot, in coming in a course like that

and being advised to come this way to get the guide path, and instead of striking it and going through had strayed from it and cut right across it and dropped—can you visualize anything in the way of operation of the propellers that might have produced such an unusual situation?

Mr. LAMBECK. Not to my knowledge. I do not believe up to the point of the crash itself, his path would be unusual. It has been described to me as being the normal overshoot that they do in an attempt to make a correction, and finally get on the guide path. At that point, that distance away from the airport, as I understand it, the airplane is inclined to cross the guide path and then turn and come back onto it again, and it may cross it several times, but by succeedingly smaller amounts until finally it stays on the path. And up to the point where the airplane crashed, it appeared to be conducting a normal landing, from everything that I have heard.

Mr. WOLVERTON. I assume it would be very difficult for you to answer that in any definite way. It is only that we are seeking, as far as we can, in most instances as laymen, excusing my friend here, to ascertain what could have caused such accidents at a particular spot, three of them inside of 2 months, and in some instances rather unusual.

Mr. HINSHAW. Mr. Chairman, I think that we had better get on with this other thing, that ties right into this: this question of spark plugs and all of he rest of it, with the other gentlemen.

Mr. BECKWORTH. I am merely waiting for the questions to cease.

Mr. MARTIN. I would like to say one more thing. We have been naturally very much disturbed at the publicity over this third accident, and disturbed to the point of believing that it may result in a lot of preconceived ideas that would lead to not finally determining what did cause this accident. It is beginning to be a very easy thing, it seems, to say that all unexplained accidents are caused by reversing propellers.

We therefore think this evidence that Mr. Lambeck has presented here, that the No. 3 propeller was not in reverse at the time of impact, is extremely important; and I want to make sure of one thing more that you gentlemen understand, because I do not think it is commonly understood. A reversed propeller, power off, produces a somewhat lower drag than a windmilling propeller in a normal low-pitch position. Now, an airplane like the Convair, for example is, as a matter of routine test, required to cut power in the middle of take-off so that one propeller is windmilling at low pitch, and to go ahead and take off. That is a part of its certification testing.

Now, if, with power off, that propeller is in reverse, the airplane would fly just as well as it would in forward pitch.

On the DC–6, for example, United Airlines rigged up an airplane so that they could reverse in flight at will. They toured their complete route and had all of their flight crews get on board and go ahead and reverse, at all different air speeds and flight conditions, to show them how the airplane handled, how it flew, and what kind of sound it made, and so forth. It flew surprisingly well, in the eyes of most of the pilots who had the experience. In fact, they tell me that the amount of trim required to even trim the airplane was very small. It was four degrees rudder trim, and no lateral trim.

I am afraid this idea that reversing is the root of all evil is getting a little bit exaggerated.

Mr. BECKWORTH. Thank you for that comment.

Now, who is the other witness who is going to appear?

STATEMENT OF F. H. FLYNN, SERVICE MANAGER, PRATT & WHITNEY AIRCRAFT DIVISION OF UNITED AIRCRAFT CORP.

Mr. FLYNN. My name is F. H. Flynn, service manager of Pratt & Whitney aircraft division of United Aircraft Corp.

There has been a great deal of testimony given to your committee, I understand, on the effects of lead. We in Pratt & Whitney Aircraft over the years have observed the effects of lead on various parts of engines, and we are definitely concerned about the increase in the lead. We thought it would simplify things for your committee if we brought down some parts from some engines, both from field service as well as some of our experimental engine running, and we have done so. They are available over here.

I would like to have Mr. Bentzinger, who is head of the technical section of our service department, go through and give you an explanation of the various exhibits that we have here. We also have representatives of our engineering department here.

Mr. BECKWORTH. What is the best procedure here to convey this to us?

Mr. FLYNN. I think we will have Mr. Bentzinger bring these over in small groups, and he can explain them and pass them around to you.

Before he does that, however, I would like to state that we also have here Mr. Borger, of Pan American Airlines, who has had quite a good deal of experience in watching the condition of motors installed in his airplanes. In addition, he is operating our competitors' engines also, and you may wish to ask him some questions at a later period.

STATEMENT OF R. G. BENTZINGER, TECHNICAL SUPERVISOR OF SERVICE, PRATT & WHITNEY AIRCRAFT DIVISION OF UNITED AIRCRAFT CORP.

Mr. BENTZINGER. I think some of you gentlemen have seen these exhibits.

Over the years we have done a great deal of work in an effort to combat the effects of lead in our engines. A great deal of it has been concentrated on the development of a spark plug or a type of plug which could readily digest the quantities of lead which we were expected to use in our fuel.

This little group of spark plugs is just a few—probably a dozen or 14 there—of the number of plugs that we have tested in a period of a year's time in an effort to find a plug which would function satisfactorily with large amounts of lead.

That is not to imply that the spark plugs now in service in the airlines are so very unsatisfactory from this standpoint. They do operate. But we are attempting to develop a plug which is considerably better in that respect.

The question has come up a number of times of just what lead does in a spark plug. If you will examine these, this little exhibit, you will see how the lead gathers between the ceramic nose insulator of the spark plug and the outside shell or the ground electrode. The lead

forms over the entire ceramic central portion, and what happens is that the lead finally gets there in sufficient concentration to cause the plug to misfire. In other words, the electrical discharge from the center electrode, instead of jumping the gap and firing the charge, discharges itself over the surface of the electrode and the cylinder does not fire.

Here are two more samples. You can observe the deposit of lead on the inside of the barrel or the threaded portion and how it accumulates. It accumulates on the ceramic portion of the plug as is indicated by these two examples.

You may pass those around and observe what takes place on the inside of them.

Mr. CARLYLE. Well, any kind of fuel would cause some sediment deposit there, would it?

Mr. BENTZINGER. Unleaded fuel would not cause a leaded deposit, and the rate of deposition is a function of the amount of lead in the fuel and the operating conditions. Naturally, if you change from 3 cubic centimeters of lead per gallon to 4 cubic centimeters, the rate of deposition would increase. In like manner, we know from experience that if the mixture is changed to what we term "a leaner mixture," you might call it a more conservative mixture, the rate of deposit increases.

The airlines, of course, like to run on as little fuel as possible, as we all do, even with our automobiles; and in doing that they lean the mixture down as far as they can and still maintain stable operation. However, the leaner you get with those mixtures, the greater the rate of deposit of this lead on the plugs and in the entire combustion chamber.

It is for that reason, or that is one of the reasons, that the operators do not like additional lead, because it does not permit them to operate at the minimum fuel consumptions which would be permissible with a lower-lead-content fuel.

These are exhaust valves. These exhibits indicate the deposits of lead that I mentioned to you. You can see them on there. This valve is one that suffered attack from the lead compounds and heat. The lead compounds work on the valve.

Mr. BECKWORTH. Are you going to pass these around?

Mr. BENTZINGER. I do not think these are particularly significant except for the deposit.

This is one that is significant, which shows the ravages of lead attack.

Mr. BECKWORTH. What is the final result of this condition right here, as an engine operates?

Mr. BENTZINGER. You mean how does it progress?

Mr. BECKWORTH. Suppose I have an engine with this in it, this valve as it is right now; what will it do to the engine?

Mr. BENTZINGER. That valve would continue to operate in its present condition.

Mr. BECKWORTH. Does it beat up the engine?

Mr. BENTZINGER. No, it does not beat up the engine. The valve will get worse, though, and that condition will not heal itself. In other words, it will progress, and it will get to look more like the second example, until ultimately this rim section becomes thin, and becomes incandescent at times to the point that it is capable of preigniting the

charge, or of actually burning the metal, because it is so thin the heat cannot be dissipated from it. We do not have a real classic example of what goes on beyond that point.

Mr. WOLVERTON. What is the effect on the operation of the engine? Does it cause engine failure?

Mr. BENTZINGER. Yes, sir; it may progress to the point where the valve will overheat and subsequently fail.

Mr. BECKWORTH. Will it cause a fire?

Mr. BENTZINGER. It might. What actually happens—you may draw your own conclusions from it—what actually happens is that it heats and the corrosion continues until finally it begins to leak past the seal. The temperature of those gases is so high that it has the same effect as a cutting torch and the metal is just eroded away by flame. It gets up into this portion of the valve which we call the neck section, and about 99 out of 100 valve failures are right at that point because of the corrosive attack of lead heating that down and down and down until finally it just fails. The seat probably gets to look as those examples look, and failure is the result.

You will observe on this one how the valve has necked down from the corrosive attack.

Mr. BECKWORTH. Does that just break?

Mr. BENTZINGER. That is when failure occurs. And the head section—the big domed portion goes down into the combustion chamber, and there just is not enough room between the cylinder head and the piston to accommodate it. The result is a battering of all of the parts associated with it and it can crack a cylinder head. It is very rarely that we see that.

Mr. HINSHAW. Is that what is called swallowing a valve?

Mr. BENTZINGER. That is right; it is exactly that.

Mr. HINSHAW. This valve and its stem here is hollow; is it not?

Mr. BENTZINGER. Yes. Here is a section of it. It is filled about two-thirds of the way up through the stem with sodium, to promote cooling and——

Mr. BECKWORTH. Do you have one in its normal shape, the way it ought to look when it is new?

Mr. BENTZINGER. Yes; I have one here.

In addition to the effect on spark plugs and valves, the lead also attacks the valve guide, that is, the portion of the engine that guides that valve in its movement. We have done a great deal of work in an attempt to develop a valve guide which would also work with this. I do not know how many valve guides we did actually try—valve and guide combinations. I think it was somewhere around 88 in the last 4 years—that is, about 88 different combinations of valves and guides in the last 4 years—in an attempt to overcome this condition. We began with this type of a guide, which is a bronze guide having a stainless-steel lip to prevent the corrosion of the bottom part or the hottest part of the guide. Even with this type of construction you can see in this particular part the corrosion that takes place.

We developed a high nickel cast-iron guide, which does not show the effects of lead attack as much as the older type. That is the valve guide which is in operation in most of our engines today. It took a great deal of work and a great deal of development to produce these parts; and the valve which we ultimately had to come to, to get around this problem, is a very expensive part, as the airlines will attest.

As some of the work that we have done to get around the effects of lead, Mr. Drogemuller ran engines at the University of Kentucky in development work, and tried to overcome the effects of lead by adding additional scavenging agents to try to get rid of it. The tetraethyl lead is placed in the gasoline together with a scavenging agent, ethylene dibromide, and the two are combined in what is called one theory of scavenger, the amount of scavenger theoretically required to scavenge a fixed amount of lead.

We tried to improve the condition by adding more scavenger. Well, the exhaust valve seat tried to disappear, and you can see from these sections what happened when we added additional scavenger.

You see this one is cut away and eaten away down, and this is a valve seat that we would normally have at the end of an overhaul period.

You will observe how one of these parts has just disappeared.

That was just one of our experiments in an attempt to get away from the troubles we have with lead.

Here are some very dirty exhibits, and I do not think you want to handle them. This shows the accumulation of lead sludge from the crankpin of a crankshaft and all of this is probably 75 percent lead, and is very sticky and dirty stuff. That bolt was removed from the crankshaft of an R–2800 engine, and it was simply removed and placed in that box, and it has not been washed and nothing has been done to it. It is just the way you see it.

You had better pass this towel around with it.

Mr. BECKWORTH. Were you able to determine about how long it took to get into that condition?

Mr. BENTZINGER. That crankshaft ran 1,100 hours.

Mr. BECKWORTH. Do crankshafts ordinarily run 1,100 hours before they are reexamined, or not?

Mr. BENTZINGER. That is normal overhaul period; yes, sir.

Mr. HINSHAW. I thought it was 1,200 to 2,000 hours, depending upon——

Mr. BENTZINGER. There is no one operating as high as 2,000 hours, and I think 1,500 hours is the maximum amount.

We have the other bolt out of the other crankpin, which shows the same condition. This is the rear bolt, and this is the front one [indicating].

Mr. HINSHAW. What happens as a result of that sludge collecting in that particular place?

Mr. BENTZINGER. Well, the sludge accumulates until there is so much of it there that the standpipes normally placed in the crankshaft to take care of it cannot handle it any more. In other words, the oil that is taken from inside the crankpin to the outside to lubricate the bearing, flows through a little standpipe, and it stands on the inside of the crankpin, so that the sludge can build up around it without going in to it.

You can get to the point where it cannot build up any more without going into the standpipe, it fills up, and then the sludge goes through the standpipe and into the bearing.

Mr. HINSHAW. What happens then?

Mr. BENTZINGER. You score a bearing, or you fail it.

Mr. FLYNN. In other words, a sudden glob of this deposit going into the lubrication system of the passages breaks the oil tension

surface and you lose your lubrication momentarily. It can even block oil passages.

Mr. BECKWORTH. Is that about all that you have to present?

Mr. HINSHAW. What quality of gasoline was used in the engine from which these crankpins came?

Mr. BENTZINGER. That fuel is now 4 cubic centimeter fuel.

Mr. HINSHAW. How easy is it to get at these particular pins to inspect them or remove the sludge in between overhauls, or get at that situation, in other words?

Mr. BENTZINGER. That point is about as far inside the engine as you can get. It is right in here [indicating], and the only way you can get to it is to remove the engine from the airplane and completely disassemble it. You have to take all of the cylinders off, and all of the connecting rods, to get that crankshaft apart.

Mr. HINSHAW. So that you cannot inspect that part of the engine by any other means than tearing down the engine completely?

Mr. BENTZINGER. That is correct, sir.

Mr. BECKWORTH. Mr. Borger, do you have any additional comments on this part of the discussion?

Mr. BORGER. Well, sir, we have been examining very carefully, and we have been very much concerned about the increase in the lead content as prescribed by order No. 4.

To review the history of that, it became effective in July. A major group of our fuel suppliers increased the lead content, the basic lead content of the 130 fuel, from 3 cubic centimeters to 4 cubic centimeters. Although we had been running in Pan American some of our operations entirely on 4 cubic centimeter fuel, because no other fuel was available in that area, and particularly our Pacific-Alaska division had run almost entirely on 4 cubic centimeter fuel, the other two divisions, the Atlantic and the Latin American divisions, had been running mostly on 3 cubic centimeter fuel.

In July, then, shipments of 4 cubic centimeter fuel started to take place instead of 3 cubic centimeter fuel, although one of our major suppliers did not change from 3 cubic centimeters until the time of order No. 4. At the time of order No. 4, the export fuel was increased to 4.6 cubic centimeters and domestic fuel is only 4.0 cubic centimeters.

Now, we operate over the oceans and over jungles, and over deserts, with not the same airport set-up, at alternate airports. And so we were concerned, and took several precautionary measures to insure that we keep up our same operating safety.

Fortunately, we have the time factor, which I believe General Arnold described at the hearing the other day, where our fuel supplies actually take time to get into the engine, and it takes time to assimilate that fuel and it is a cumulative effect. Therefore, we have set up our chief chemist and his staff to carefully evaluate our engines and the effects of these lead things.

Now, I have with me some of the preliminary data that is just in draft form, and we can see what happens to these engines, some of the things Mr. Bentzinger showed us.

Mr. WOLVERTON. May I interrupt, Mr. Chairman, to ask whether this that you are now mentioning is from the engines that were in these accidents, or are they from some other engines?

Mr. BORGER. These, sir, represent the type of engines that Pan American operates. We do operate the type of engines that were in these accidents, and we operate Convair 240's with the R–2800 engine.

Mr. WOLVERTON. I am interested in what you are going to say, but I did want to know whether it was the exact engines.

Mr. BORGER. No, I would not want to say they are the exact engines; I would say in general typical.

Mr. WOLVERTON. May I ask one further question, Mr. Chairman? Is there anyone going to testify this evening with respect to an examination made of the engines that were in the planes that crashed?

Mr. FLYNN. I might be of some help. I did not do it personally, but two of our service representatives did, and they gave me a first-hand description of the engines, plus the fact I attended the hearings. I can give it to you second-handed.

Mr. WOLVERTON. I thought perhaps some representative of Pratt & Whitney had been in on those examinations of those engines that were in the planes that crashed, and intended to testify with respect to what they observed.

Mr. FLYNN. Unfortunately, we did not have that under consideration. Our attendance here was purely on the lead aspect. However, two of our representatives were on the investigating teams, and were party to the reports turned in at the CAB hearing.

Mr. WOLVERTON. May I ask his name and his official position with your company?

Mr. FLYNN. It was Mr. Fagan, service representative. He was in the National Airlines accident investigation; and Mr. Burger, service representative, was also a member of the power-plant investigating committee on the American Airlines crash.

Mr. WOLVERTON. At some time or other I wanted to be in a position to ask to what extent any of these conditions that had been revealed to us this afternoon were found or not found to exist in the engines of the planes that crashed.

Mr. BECKWORTH. I think that your desire there is well founded, Mr. Wolverton.

I would suggest, if it would be satisfactory with you, that we probably would want to get some time the man who actually made the study, rather than perhaps having a man who has just heard about it—not that you do not know a lot about it.

Mr. FLYNN. It would be better to get it first-hand.

Mr. BECKWORTH. Yes; and I am sure you could be helpful.

Mr. WOLVERTON. You would prefer it to be that way?

Mr. FLYNN. And not only that; I am sure the CAB would be glad to give you a transcript or show you the exhibit of their reports of their entire groups, which would probably be more valuable than one man's opinion.

Mr. BECKWORTH. If that is satisfactory, we will expect to do that at some future date.

Mr. FLYNN. That is fine.

Mr. BECKWORTH. Now, we do want you to proceed, and may I say this: Naturally, some of our friends here have to think of their arrangements for tomorrow, and so forth, so we do want to make it as brief as we can. And that is said not to discourage you in making your statements as complete as you wish, but I do want to keep that in mind.

Mr. WOLVERTON. In other words, he is speaking to the members of the committee, not to ask too many questions.

Mr. BECKWORTH. No. I just want to make the meeting reasonable in time.

Mr. WOLVERTON. It is perfectly proper.

Mr. BORGER. I do not propose to take too long.

The main thing I would like to bring to your attention is that these conditions are existent in engines, and they are existent in all engines, all aircraft engines, to a varying degree; and really what we are talking is about the degree to which they occur in the engines and their effect on the engines.

Now, we have made surveys; and if you care to look at some of our engines showing the accumulations, for example, on an R–2000 engine which powers a DC–4, we find that these crankpin deposits that Mr. Bentzinger showed you seem to reach a peak at around 800 hours, and that beyond that they do not seem to accumulate much more. It means that either the pin is full or that it is finding some way of throwing it off. And there do not seem to be too detrimental effects on that, and I would anticipate that, as a guess, the increased lead content, for instance, on specifically the R–2000 in that respect probably would not be too harmful. That is a temporary conclusion that we draw from these data, and maybe we will change our mind later.

Now, some of the other engines seem to be more sensitive. In particular, there is the R–3350 engine, which is not a Pratt & Whitney engine, which shows a tendency to be increasing the deposits up to and including the maximum 1,000-hour period that is allowed in our overhaul. Wright is developing some changes to combat this situation, but as yet we have not observed the effects of these.

Now, I am speaking of the engines that we operate, which are the 3350–B–A engines.

Mr. HINSHAW. These are Wright engines?

Mr. BORGER. These seem to exist in all. The major difference between the Wright and the Pratt & Whitney engines most commonly used in the airlines is the matter of fuel injection. There does seem to be a better distribution of the fuel to the individual cylinders on a fuel injection engine, and the Wright 3350 engines do have that, and not the engines used to power some DC–3's.

Other conditions that are existent there we have had—I tend to go along, from our observation, with Mr. Drogemuller's general approach to the thing, that a little bit of lead probably does a lot of good. But as we increase it some proportion, it is not in direct proportion, and it seems to get increasingly worse as you increase the limit.

We have had a successful operating record with our R-2000's out in the Pacific, and with 4.0 cc's of lead; and we wanted to get 3 cc's, but the vendors in that area could not supply it. And obviously, the price to put in a competitive fuel from other areas of the world was prohibitive, the shipping costs of these special fuels would be prohibitive.

We have not voluntarily used any fuel of greater than 4 cc's in the past, until the November 1 order. We have now, and we estimate that our Atlantic division, for example, will use about 62 percent of 4.6 fuel, and the Latin American division is about the same, around 60 percent. But our Pacific division is down only about 40 percent. We are watching it very carefully, and we are setting up precautionary

measures, as we have found it desirable already to reduce the spark plug change time on our Convair 240, the 2800 engine. They were up at 420 hours, and we have found it desirable to cut it down to 225 hours.

Frankly, the severity of the thing is not in proportion to that time reduction. We obviously, as I mentioned before, set up our changed schedules to coincide with the ordinary maintenance schedule; and what we did specifically, in maintenance lingo, we changed our spark plug change period from a No. 3 service to a No. 2 service. We would not want to reduce it from 420, let us say, down to 300, and it is more convenient for us, operationally—the airplanes are scheduled into Miami, for example, Mr. Wolverton, at 225 hours, that is our regular procedure, and I think that you will find that all of the airlines follow such procedures.

Mr. WOLVERTON. May I ask what change, percentagewise, if you are able to determine it, in the cost of operation as a result of using the higher lead content, have you had?

Mr. BORGER. We are not able to determine it yet, and we are certain that it would go up.

Mr. WOLVERTON. Well, I have in mind, as you have indicated, the overhaul time is less. That means more direct cost. And from some other reading I have done on the subject, it would seem as if you used more gasoline.

Mr. BORGER. There is indication that we will use more gasoline. Specifically, again for specific reasons, on the 3350 we have felt it desirable to increase our reserve fuel by about 2 percent to provide for enrichment, because our operating technique calls for operating that engine leaner than any other engine.

I do not know, and we will not know for some time, the exact increase in our total fuel consumed.

Mr. WOLVERTON. Have other companies put into effect lower time schedules for overhauls and maintenance work, the same as your company has?

Mr. BORGER. I do not believe anybody has fully put into effect any reduced times on engine overhaul. We have not, and I hope I did not create a wrong impression, we have not found it necessary yet to reduce overhaul periods.

We are alerted to the situation and we are prepared to do so the moment it becomes advisable, and I think, sir, that we can do so because of this progressive time factor; we can take the proper measures without incurring any failures due to this.

Now, that is going to rest a great deal, I appreciate, on the ability of our people who are watching that very closely.

Mr. WOLVERTON. I had the impression you had to change the spark-plug time.

Mr. BORGER. Yes; and I think one other airline is—and I think Mr. Horne mentioned that the other day—that they had to reduce spark-plug-change period on the DC–4.

I think we will find more and more of that coming along as the airlines get into that.

Mr. WOLVERTON. Did not the ATA send out some kind of a questionnaire form to be observed by the different companies so that some conclusions could be reached?

Mr. BORGER. Yes. We have done that and we are all contributing to that reporting system.

Mr. WOLVERTON. Are all of the airlines contributing to that request?

Mr. BORGER. To the best of my knowledge they are.

Mr. WOLVERTON. How long do you assume it would take to get any definite results or come to definite conclusions?

Mr. BORGER. Well, I think in scattered instances we are coming to some conclusions already, like these two occasions that I mentioned. To get the full conclusions, I would say that it would be another 6 months or so.

Mr. WOLVERTON. Judging by the results that might happen, it seems to me that is an awfully long time to wait and see what should be done.

Mr. BORGER. Well, sir, I agree with you from that viewpoint, but I think, sir, to explain the complexities of the thing, it will take a very long time; and I think, sir, the possibilities, if I can put it this way, the possibilities of trouble occurring are not as great now as they would be 6 months from now.

In other words, we are trying to keep abreast of the things occurring ,and I think, sir, that we, as airlines, are doing a good job on it. That may be an erroneous conclusion.

Mr. WOLVERTON. Have you found whether there have been any engine failures as a result of plug fouling?

Mr. BORGER. We have always had on occasion scattered instances of requiring a shut-down of an engine due to plug fouling. Now, I must explain, sir, what is called a failure—an engine shut-down frequently is not an absolute failure. The pilot can draw power from that engine in emergencies if he wants to. On many occasions, if the pilot has a rough-running engine, he will shut it down just to conserve that engine so that it will be available for bad weather ahead or for the landing or for some occasion like that.

Over the years the airlines have always had one kind of difficulty or another with plug fouling ever since we have had leaded gas. The effects of that differ from time to time and we set up precautionary measures to avoid that shut-down due to such fouling in flight.

For example, we have the engine run-ups before every take-off. Those are required by CAB.

And the magnetos are checked, which means that the pilot switches to run each cylinder on one spark plug, and there are two plugs in each cylinder.

And on all aircraft engines, if he observes the r. p. m. of the engine to drop beyond the limits that are set by the airline, which usually vary from 60 to 100 r. p. m., he has to return to the ramp and either get spark plugs changed or take other corrective action.

Now, specifically, on our airlines we have an engine analyzer, which is an electronic device which permits the flight engineer, in this case one of the large four-engine airplanes, to examine the firing of the spark plug at any time in flight, and he usually checks those at half-hour intervals, and always just prior to landing, because then he can tell the ground mechanics that he has got one or two bad plugs and get them changed during the routine checks.

Mr. WOLVERTON. Have you, by experience with your own company or what you may have learned from others, gathered any information to indicate that the change in the fuel lead content has resulted detri-

mentally and produced any engine failures or conditions that you would consider detrimental to safe flying?

Mr. BORGER. As a result of over-all operating experience—and I think I can speak for myself and Mr. Priester, who is my immediate superior, and who has been in the business for over 30 years—we feel that the increasingly high lead content is detrimental to the performance of the engine. We feel, as I said before, that certain small amounts of lead, that is, up to 3 cc.'s show no appreciable effect whatsoever, and there are some effects but they are minor. Between 3 and 4 cc.'s, we feel we can adopt, and we have been able to adopt, appropriate maintenance procedures and other features that will overcome the effects. We feel we can control those effects.

Beyond 4.6 range, which we had experience with during the war, we know the effects will be increasingly detrimental, but exactly where and how they will affect us, we don't know. And that is why we have set up this very careful evaluation program, watching every one of our engines come in as they come in.

Mr. WOLVERTON. That is all.

Mr. HINSHAW. I would like to ask a question of Mr. Flynn.

You have a great many aircraft engines of the size of the R–2800 and above that, installed on military aircraft?

Mr. FLYNN. That is right.

Mr. HINSHAW. Do you have any records of military aircraft so far as the detrimental effects of the high content of lead which they are necessarily using, in comparison, let us say, with the airlines who are using smaller lead content gasoline?

Mr. FLYNN. No; we do not have any accumulative records over the period, but from our observations so far as home office personnel, as well as field service personnel, is concerned, we know that plug fouling is more prevalent in those larger engines in the military services.

Mr. HINSHAW. Is there anything besides plug fouling that occurs? On what kind of a service was this valve seat chewed away, or was that something that has been chewed away in your own testing laboratory?

Mr. FLYNN. This one, I believe, was during the tests at the University of Kentucky, but we have seen signs of similar conditions, both in military and airline engines, from the effects of lead.

Mr. HINSHAW. Do you overhaul any military engines?

Mr. FLYNN. Only occasionally.

Mr. HINSHAW. So you would have very little opportunity to inspect the parts?

Mr. FLYNN. We have servicemen stationed at the main depots where the engines are being overhauled. Also the fact that certain people of our organization go periodically from the home office and visually inspect the parts.

Mr. HINSHAW. Do you happen to know what the length of time is between overhauls on a military engine of a particular class?

Mr. FLYNN. They vary from, I would say, some as low as 300 hours on up to 1,000 hours, generally the higher time on military equipment, similar to the airlines, such as cargo or transport service; the lower times are generally on the military bombers and fighters.

Mr. HINSHAW. Let us take the R–2800, let us say, out of Naval Air Transport Service. Do you know what the overhaul period time is for their engines?

Mr. FLYNN. I believe they are around about 700 to 800 hours.

Mr. HINSHAW. Which is a couple of hundred hours shorter than the normal air transport of the civil category?

Mr. FLYNN. It is a little more than a couple of hundred hours. Your average time between overhauls runs anywhere from 1,000 hours up to 1,500 hours in commercial aviation.

Mr. HINSHAW. In other words, they compensate for the use of high tetraethyl lead and other factors in connection with their own operation, by shorter overhaul service?

Mr. FLYNN. I do not want to leave the impression that it is entirely due to lead, and you mentioned other factors. I just wanted to make sure it was definitely understood.

Mr. HINSHAW. With the shorter overhaul period, if these curves and graphs that have been shown us by the gentleman from Pan American are anywhere near true, they would catch these main bearings, for instance, or crankpins, before the time that the well was filled?

Mr. FLYNN. That is correct.

Mr. HINSHAW. But in an airline operation where the time has been stretched out to a longer period, they would certainly fill up with that stuff?

Mr. FLYNN. That is correct.

Mr. HINSHAW. Do they send in to you damaged parts with any explanation as to why they are damaged?

Mr. FLYNN. When you say "they," who do you mean?

Mr. HINSHAW. I am talking about the military.

Mr. FLYNN. Yes. And not only that, we have our own servicemen there who check on all damaged parts and they try to give us a running record, keeping us informed of all individual parts giving trouble.

Mr. HINSHAW. I think we realize that military aircraft are treated considerably differently than are civil commercial aircraft, and therefore it is not easy to make a direct comparison as to what the effects may be of a particular subject such as the tetraethyl lead business; and at the same time, spark plug fouling and that sort of thing must take place.

Mr. FLYNN. That is right, and I believe Mr. Drogemueller has done some work along the line of a general investigation, which included military experience.

Mr. HINSHAW. Does the military change spark plugs more often than the airlines?

Mr. DROGEMUELLER. Yes, sir.

Mr. HINSHAW. What is their general plug change time?

Mr. DROGEMUELLER. I believe it is approximately 100 hours.

Mr. HINSHAW. As compared to 225 on Pan American?

Mr. DROGEMUELLER. That is right.

Mr. HINSHAW. Of course, the economic factor is not in the military as it is in the airlines.

Mr. DROGEMUELLER. That is right.

Mr. BECKWORTH. If that is all of the questions, gentlemen, the committee certainly wants to thank each one of you for your constructive and informative answers to the questions that were asked, and for the patience you have shown in the hearing we have had here.

Mr. HINSHAW. Mr. Chairman, I think that while we have asknowl-

edged the entry of certain members of our committee and Members of Congress, we forgot to acknowledge the presence of Mr. Davis of the PAD.

Mr. BECKWORTH. Yes, Mr. Davis, we certainly are grateful to you for coming.

Mr. DAVIS. Thank you, Mr. Chairman.

Mr. FLYNN. May I express my appreciation for the opportunity to give you this information.

Mr. BECKWORTH. And we want to thank the fine representative of United, Mr. Henry Mooberry, for what he has done to make possible this meeting; and also to thank our chairman, the chairman of the entire committee, Mr. Crosser, for coming here and joining us.

Mr. MOOBERRY. We thank you for the opportunity of appearing before you.

(Whereupon, at 7:20 p. m., the hearing was adjourned.)

APPENDIX

MUNITIONS BOARD,
Washington 25, D. C. April 21, 1952.

Hon. LINDLEY BECKWORTH,
House of Representatives.

DEAR MR. BECKWORTH: Reference is made to my letter of April 11, 1952, concerning the tetraethyl lead content of aviation gasoline and its effects on performance of engines in military aircraft.

Additional information has been received from the Chief, Bureau of Aeronautics, Department of the Navy, under date of April 4, 1952, and is quoted in part as follows:

Although there is no direct comparison of the fuels within the naval service, the safety record established by VR squadrons operating scheduled flights with FLOGWings and MATS while using highly leaded fuel compares most favorably with commercial operations on lower leaded fuels. It would be expected that an increase of lead in the fuel would result to a certain extent in increased maintenance, particularly with regard to spark-plug life. For information the average engine life between overhauls of several engines used by both the naval service and the airlines are presented herewith.

Aircraft	Engine	Hours
R5D	R-2000	953
R4D	R-1830	6-700
JRM and R60	R-4360	350-380

I trust that the above and that contained in our letter of April 11, 1952, will provide you with adequate information concerning the effect of high lead content aviation gasoline on the operation of military transport aircraft.

I am happy to be of service to you at any time.

Sincerely yours,

G. H. MONTGOMERY,
Colonel, United States Army.
(FOR ALFRED H. JOHNSON,
Brigadier General, United States Air Force, Chief, Office of Petroleum Programs.)

UNITED STATES DEPARTMENT OF THE INTERIOR,
PETROLEUM ADMINISTRATION FOR DEFENSE,
Washington 25, D. C., March 13, 1952.

Hon. LINDLEY BECKWORTH,
House of Representatives.

DEAR MR. BECKWORTH: Under date of March 7 you wrote to Secretary Chapman expressing the opinion that "if supplies will possibly permit, it would be a good thing to suspend the order"—referring to PAD Order No. 4. This order, issued October 19, 1951, requires refiners to use a minimum of 4 cubic centimeters of tetraethyl lead per gallon in commercial grade aviation gasoline.

Secretary Chapman has always given assurances that the restrictions would be lifted as soon as feasible. On October 29, 1951, he gave such assurance to Mr. D. W. Nyrop, Chairman of the Civil Aeronautics Board; on November 6, 1951, to Mr. Milton W. Arnold, of Air Transportation Association of America, and on March 3, 1952, to Congressman Wolverton, of your subcommittee. I am glad to reiterate this assurance to you on behalf of Secretary Chapman and

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his Petroleum Administration for Defense that the restriction will be lifted as soon as the supply situation permits.

It has been our constant and sincere endeavor to administer our defense mobilization responsibilities for petroleum with the bare minimum of controls and interferences with the normal commercial practices of free enterprise. It is quite true that the airlines, their regulatory bodies, their engine suppliers, and their trade associations all remonstrated with PAD against the issuance of the restriction. This should surprise no one. Interference with normal trade practices by the issuance of defense mobilization orders always brings protest. It is still the duty of the agency having such responsibilities to weigh objections, evaluate the greatest good to the Nation, and act in accordance with its best determinations.

Facts are stubborn things, and I urge you and your associates not to let your view of the plain facts be obscured by special pleaders or "I told you so" testimony. Here are some of the facts upon which we have based and continue to base our belief that PAD Order No. 4 does not impair the flying safety of well-managed airlines.

1. During World War II all planes, military and commercial, used fuel containing 4.6 cubic centimeters of tetraethyl lead per gallon.

2. It is the plane engine that uses the gasoline, and the engines used in Lockheed Constellations, DC–3's, DC–4's, and DC–6's are the same types that propelled the air fleet, military and civilian, during World War II.

3. Since World War II all military craft have continued to use gasoline containing 4.6 cubic centimeters of tetraethyl lead per gallon.

4. Prior to the issuance of PAD Order No. 4, of the 10 principal suppliers of 100-octane aviation gasoline to the domestic trunk airlines in the United States, 4 suppliers produced only gasoline containing 3 cubic centimeters of tetraethyl lead per gallon, 4 suppliers produced only gasoline containing 4 cubic centimeters of tetraethyl lead per gallon, and 1 produced two grades (3 and 4 cubic centimeters) and one produced one grade containing 3.5 cubic centimeters of tetraethyl lead per gallon.

5. In his letter of November 5, 1951, to Secretary Chapman (an exhibit before your committee), Mr. Arnold, of the Air Transportation Association of America, said:

"* * * it is rare for particular airplanes to be operated exclusively on either 3 or 4 cubic centimeters due to the nature of the routing of aircraft over airline systems."

6. Below are listed the pre-PAD Order No. 4 buying habits of five of the prominent domestic trunk airlines:

Line A (eastern part of United States), well over half of all gasoline at 4 cubic centimeters.

Line B (eastern part of United States), prior to 1951, all at 4 cubic centimeters; during 1951, prior to PAD Order No. 4, over 50 percent at 4 cubic centimeters, and more at 3.5 cubic centimeters.

Line C (coast to coast), half at 4 cubic centimeters.

Line D (eastern part of United States) all at 3 cubic centimeters.

Line E (western part of United States) all at 4 cubic centimeters.

7. In 1951, prior to PAD Order No. 4, 48 percent of all commercial 100-octane aviation gasoline production sold in the United States as reported to PAD by manufacturers under the provisions of the Defense Production Act, contained 4 cubic centimeters of tetraethyl lead per gallon or more, and 51.7 percent of the total volume for commercial use in the fourth quarter of 1951 was already scheduled to be produced contained 4 cubic centimeters of tetraethyl lead per gallon or more.

8. Finally, it may be noted that every commercial plane requiring 100-octane aviation gasoline that was fueled at and took off from the National Airport at Washington, D. C., from the day it opened for business until January 1, 1951, was fueled with gasoline containing 4 cubic centimeters of tetraethyl lead per gallon or more. I recall having chatted with you at that airport on at least one occasion before we took off on our respective missions. I assume that in all probability all of the members of your subcommittee have traveled by plane to and from that airport, and it seems highly probable that the airline witnesses before your committee have also used commercial planes out of that airport.

There is one central fuel-storage system at the National Airport, and until December 31, 1950, all of the aviation gasoline put into the system since the airport opened had contained 4 cubic centimeters of tetraethyl lead per gallon. Commencing in January 1951, the business of supplying the airport with gasoline

was "split," and one of the new suppliers sold gasoline containing 3 cubic centimeters of tetraethyl lead per gallon. It went right into the same central-storage system along with the continued supply of 4 cubic centimeters of gasoline from the other supplier. Those concerned with the evaluation of PAD Order No. 4 and the current safety investigation should certainly be impressed by this fact concerning the National Airport.

Sincerely yours,

BRUCE K. BROWN, *Deputy Administrator.*

Mr. BRUCE K. BROWN,
Deputy Administrator, Petroleum Administration for Defense,
Washington 25, D. C.

DEAR MR. BROWN: Receipt is acknowledged of your letter of March 13, replying to the suggestion made in my letter of March 7 to Secretary Chapman, that if supplies possibly permit, it would be a good thing to suspend PAD Order No. 4.

The detailed statement you have made in your letter of the facts upon which you based your "belief that PAD Order No. 4 does not impair the flying safety of well-managed airlines," cannot but be helpful to an understanding of just what may be involved in operation of aircraft engines with gasoline containing the higher tetraethyl lead content required by the order.

Such statement, however, seems to me to be not exactly responsive to my letter to Secretary Chapman, which was predicated upon the supply situation and not upon the feasibility of operating under specifications as required by PAD Order No. 4.

Just what this situation may be is not clear to the committee. The testimony given us by your Mr. C. E. Davis seems to intimate that increased demands did not materialize to the degree anticipated at the time of issuance of the order, and various statements in the press from time to time in the past permit the inference that the shortage in supplies was not as great or as difficult to meet as originally contemplated. While undoubtedly the salient facts regarding the aviation gasoline demand-supply situation are readily at hand to your agency, such facts continue elusive to the committee.

I should welcome, accordingly, your informing the committee of just what were the instant month and immediately ensuing months' demands, both military and civilian, both domestic and foreign, for 100- 108- and 115-octane-grade gasoline, as projected at recent dates, say the 1st of each month commencing with August 1, 1951; the supply of each grade as projected at the same dates, and the supplies which actually were produced compared with such projected supplies; together with the various pertinent factors bearing upon your estimates of demand, such as, firmness of foreign demands or requirements, effectiveness of military requirements in terms of appropriated funds, liftings, and the like. In view of the possibility that matters involving national security may be part of the data sought, it well may be that you would prefer to present such to the committee in an executive session—which we shall arrange promptly at your convenience—rather than through a formal public statement.

This is not an idle request for information, for over and above the interest which this Aviation Subcommittee has in any possible relationship which may exist between the type of gasoline used and air safety, the House Committee on Interstate and Foreign Commerce, through a subcommittee of which I am chairman, is specifically directed by special resolution of the House, to look into and to report upon the extent to which the plans of any agency involving specification changes, such as has occurred in this order, are necessary in connection with the national-defense effort, and the extent to which they may represent an attempt to change our domestic economy along lines not authorized by the Congress.

In passing I note your admonition that facts are stubborn things, and that our committee should not let our view of plain facts be obscured by special pleaders or "I told you so" testimony. In the same breath, of course, that Dr. Sangrado propounded to Gil Blas, of Santillane, the oft-quoted remark that "facts are stubborn things," he deplored his former student's having abandoned a profession "with the guiding influence of heaven to defend you from the dangerous allurements of chemistry."

I am sure that you are well aware of our appreciation of the sincere effort you are putting forth in the difficult art of petroleum chemistry under these most troublesome times. I am sure, also, that you did not intend to imply that our committee should not hear testimony from any other persons, no matter how much they might be deemed to be pleading for a special interest. One of

the rights of our people, guaranteed by our great Constitution, is that any person has a right to petition the Congress for a redress of a grievance. It is our duty and our privilege to hear any such person, and from his helpfulness in offering all information relative to our understanding of a subject, as well as from similar unstinted cooperation from yourself, to legislate in the best interests of the people.

Thanking you again for your letter, and trusting to hear from you soon as to a time when we might elicit this information,

Very truly yours,

LINDLEY BECKWORTH,
Chairman, Aviation Subcommittee.

UNITED STATES DEPARTMENT OF THE INTERIOR,
PETROLEUM ADMINISTRATION FOR DEFENSE,
Washington, D. C., March 31, 1952.

HON. LINDLEY BECKWORTH,
House of Representatives.

DEAR MR. BECKWORTH: This is in reply to your recent letter which I received on March 28, 1952, requesting information in regard to the demand and supply picture for military and civilian aviation fuels of the various 100 and higher octane grades, both domestic and foreign.

We did not understand that your letter of March 7, 1952, to Secretary Chapman requested that we give you our restricted data on supply and demand but only that we reconsider the matter and "if supplies will permit, it would be a good thing to suspend the order."

You have now requested "instant month and immediately ensuing months' demand" figures, together with the various "pertinent factors bearing upon your estimates of demand, such as, firmness of foreign demands or requirements, effectiveness of military requirements in terms of appropriated funds, liftings, and the like." We note that you appreciate the fact that the various supply-versus-demand figures with which the Petroleum Administration for Defense has worked are subject to interpretation by this office, and as these figures have become available to us, we have, indeed, made an effort to determine whether such figures are realistic.

The Petroleum Administration for Defense has issued every month since October 1950 a report entitled "Aviation Gasoline" (confidential), in which our conclusions as to the projected production and firm demand for aviation fuels are summarized and discussed for the purpose of advising the military as to the best available evaluation of the aviation gasoline situation. The House Committee on Interstate and Foreign Commerce has been supplied with copies of this report, beginning with report No. 5, issued February 28, 1951. These reports have been sent to Mr. Andrew Stevenson, a member of the professional staff of the committee.

You will note from these aviation gasoline reports that from time to time the Petroleum Administration for Defense has had various information about situations which were expected to develop in military or other requirements but which were not firm at the time of issuance of the reports, and you will, no doubt, recognize that a specific numerical evaluation of the instantaneous supply and demand situation at any time, therefore, would require arbitrary assumptions being made concerning the above factors. The Petroleum Administration for Defense must look to the Armed Services Petroleum Purchasing Agency for information on the quantity of aviation fuels which they are prepared to purchase, and it should be noted that this information changes with the current military situation.

A review by your committee of these reports will give you a summary account of the information available to the Petroleum Administration for Defense at the time of issuance of these reports and our honest appraisal of the existing and projected supply and demand of aviation fuels. I quite understand that these monthly summary reports do not provide long range appraisals of comparative demand figures nor do they give performance figures beyond the month under review. Long range forecasts are useful for determining trends and for planning purposes but are subject to several deficiencies, the most important of which are:

1. Fluctuations in military demand from operational origins.
2. Fluctuation in Military demand caused by appropriation variables.

These fluctuations in demand have all been over the level of maximum production since PAD Order No. 4 was introduced. In other words, there has been a continuous shortage, the amount of which has varied from month-to-month as a result of these factors. However, at no time have we been able to foresee a balanced supply position for more than a few weeks ahead ,and even then we have been aware of additional military requirements in a provisional status awaiting appropriations.

We are now developing more statistical information to conform as nearly as possible to the request contained in your letter which should be ready in about 1 week, and if the type of information and data contained in the "Confidential" reports to which reference is made above is not in sufficient detail, we shall be glad to appear in executive session or to present such additional information in writing under appropriate security classification for your further consideration.

Sincerely yours,

BRUCE K. BROWN,
Deputy Administrator.

AIR TRANSPORT ASSOCIATION OF AMERICA,
Washington, D. C., April 2, 1952.

Hon. LINDLEY BECKWORTH,
House of Representatives,
Washington 25, D. C.

DEAR MR. BECKWORTH: We are in receipt of a copy of an undated letter to you from the Department of Interior, Petroleum Administration for Defense, concerning the lead content of aviation gasoline, which contains a supplement to the testimony given by the PAD before the Aviation Subcommittee on March 3, 1952. In view of this PAD material we also should like to supplement our testimony presented at the hearing on March 3 with respect to certain points covered by the PAD letter as follows:

(1) The seriousness of the increase in tetraethylin on airline operations.

(2) The airlines' purchase of 4 cubic centimeters rather than fuel of lower lead content.

(3) The amount of 4 cubic centimeters tetraethyl used prior to PAD Order No. 4.

With respect to item (1), the airlines, the CAA and CAB have repeatedly advised the PAD that an increase in tetraethyl would decrease the safety of airline operations. We are convinced of this and are attempting to collect quantitative data in vertification thereof. Some of this data already has been received since the issuance of PAD Order No. 4. Pan American World Airways recently has advised that increases in tetraethyl have caused appreciable increase in stuck or sluggish blower clutches on R–2000 engines (DC–4 airplanes). The history shows only two such occurrences in the first half of 1951, eight in the second half and one case in January 1952. Pan American used almost 100 percent 3 cubic centimeters fuel in these engines, changing to 4 cubic centimenters in midsummer 1951 and, of course, much of Pan American's fuel is increasing in lead content to 4.6 cubic centimeters which will make the above condition worse. National Airlines has supplied us with a chart, copy of which is attached hereto, showing the effect of the increase in lead content on premature cylinder removals for the R–2800–CA15 engines (DC–6 airplanes). The chart shows a rapid increase in cylinder removals after November 1951, which was the date of effectiveness of PAD Order No. 4. Also attached is a copy of a letter from National Airlines to Donald W. Nyrop, elaborating on the company's lead problem.

Concerning item (2), the fact that the airlines flew with a higher leaded fuel during World War II is beside the point as far as the present situation is concerned. At that time the overhaul periods for engines were a great deal less than could be tolerated today and, even so, a terrific amount of trouble was experienced with the engines due to leaded fuels. As a result of this experience the airline industry insisted immediately after the war that the lead content of commercial aviation fuel be reduced from the 4.6 cubic centimeter value specified by the military to 3 cubic centimeters. This reduction was attained by vigorous efforts of airline personnel working through industry committees charged with such matters. The petroleum industry was not in favor of manufacturing two grades of fuel and, naturally, the airlines paid an economic penalty for lower leaded fuel. In every case we have checked where airlines used fuels greater

than 3 cubic centimeters of lead we have found the airline was forced into the situation. One airline, prior to the Korean incident, attempted to procure 3 cubic centimeter fuel from west-coast suppliers, but was told that it might be obtainable at a prohibitive increase in price of 5 cents per gallon, which was simply the fuel company's way of saying "No".

With respect to item (3), the average lead content used by the airlines prior to PAD Order No. 4 was stated by the PAD to be approximately 3.5 cubic centimeters. We believe that this value is on the high side as reported by the CAA However, we do not have sufficient data to argue this point further. It appears to us that the difference between the PAD and the CAA figures is that the PAD figures were based upon total domestic consumption of aviation gasoline while the CAA figures were based on fuel actually used by the scheduled airlines.

The detrimental effects of lead on engine operation are well known and, as previously stated, we are attempting to obtain quantitative data to show such effects. The adverse effect on safety of decreased engine reliability is a very serious matter as far as the public is concerned, and every effort should be made by the Government to alleviate the shortage of aviation fuel by all other methods before commercial aviation fuel becomes affected.

Sincerely yours,

MILTON W. ARNOLD,
Vice President, Operations and Engineering.

NATIONAL AIRLINES, INC.,
March 10, 1952.

Hon. DONALD W. NYROP,
Chairman, Civil Aeronautics Board,
Washington 25, D. C.

DEAR MR. NYROP: This is in reply to your letter of February 28 relative to the Petroleum Administration for Defense Order No. 4.

For your information, following is a description of the difficulties we have experienced since the introduction of higher lead content in our aviation fuel.

The over-all picture is probably best shown from the premature engine removal rate. Our DC–4 premature engine removal rate for the period January 1, to October 31, 1951 was 0.36 engine per 1,000 hours of operation. For the period of November 1, 1951, to February 29, 1952 the rate was 0.60 engine per 1,000 hours which represents an increase of 66⅔ percent. Our DC–6 premature engine removal rate for the period January 1, to October 31, 1951, was 0.61 per 1,000 hours of operation. For the period of November 1, 1951, to February 29, 1952, the rate was 1.34 per 1,000 hours which represents an increase of 119.5 percent.

Although the above figures show an alarming increase with the advent of increased lead content in our aviation fuel, one could rightly say that the increase may have been from some other cause which occurred at the same time. However, combustion chamber distress is probably the one place where the effects of lead are most pronounced. The following figures speak for themselves.

DC–6 R–2800–CA15	Jan. 1, 1951, to Oct. 31, 1951	Nov. 1, 1951, to Feb. 28, 1952	Percent increase
Premature cylinder removal rate:			
Burned pistons	0.0101 per 1,000 hours	0.074 per 1,000 hours	632
Cracked heads	0.132 per 1,000 hours	0.593 per 1,000 hours	348
Burned exhaust valves	0.182 per 1,000 hours	0.47 per 1,000 hours	158
Low compression (exact cause not recorded).	0.243 per 1,000 hours	0.862 per 1,000 hours	255

DC–4 R–2000–D3	Jan. 1, 1951, to Oct. 31, 1951	Nov. 1, 1951, to Feb. 16, 1952	Percent increase
Premature cylinder removal rate:			
Cracked heads [1]	0.0136 per 1,000 hours	0.043 per 1,000 hours	216
Burned piston	0.0273 per 1,000 hours	0.043 per 1,000 hours	57
Low compression (exact cause not recorded).	0.0546 per 1,000 hours	0.22 per 1,000 hours	303

[1] Since Feb. 16, 1952, there have been 2 or more premature cylinder removals for cracked heads on DC–4 engines which would bring the premature removal rate for that cause up to approximately 0.115 per 1,000 hours or an increase of 747 percent.

It is apparent from the above figures that combustion chamber distress has increased considerably and when this increase is compared to that of the whole engine, it is evident that troubles from causes other than combustion chamber distress have decreased, otherwise the premature engine removal rate would have been much higher.

We have instituted a number of changes to combat this effect. Probably the best way to present the changes we have made is to present the recommendations set forth in Aviation Safety Release No. 355 and then show the action taken.

"(*a*) (Cruise with warm (60° to 75° F.) carburetor air and maintain cylinder head temperatures to the high side." With the DC–6 our problem is to keep the engines cool enough especially as we believe that higher cylinder head temperatures and/or carburetor air temperatures are highly conducive to detonation on this engine. The DC–4 engine is exactly the opposite and we have difficulty keeping it warm enough. This is a problem we have had with us for years and, in order to have better control, we have a test program set up with region 2 of the Civil Aeronautics Administration wherein we propose to permanently close two or more cowl flaps provided we can meet the METO power cooling requirements. Using higher carburetor air temperatures is now under consideration for the DC–4.

"(*b*) Avoid extremely lean operation." We use best power F/A for cruise on our DC–6 engines and have been doing so for nearly 3 years. Our DC–4 engines operate at very lean fuel/air ratios but at 37° spark timing which we believe will counteract the effect of the lean F/A.

"(*c*) Remove and clean or renew spark plugs more frequently." We have reduced our spark-plug removal period from 500 hours to 400 hours and have a further reduction to 300 hours under consideration. We have instituted a practice of using only new plugs in our DC–6 engines.

"(*d*) Periodically exercise exhaust valves while supplying penetrating oil or 'upper lube' to the valve stem or supply such oil to the air inlet when the engine is idling. Such practice may offer some relief from sticking valves." We believe the extra man-hours expended to carry out the above procedure far outweigh the slight benefit that may be derived, therefore, we do not propose to begin this practice.

"(*e*) Periodic cylinder top overhauling may be necessary between major overhauls in order to forestall chronic failures of the pistons and valve components." We are at present top overhauling any engine on which it becomes necessary to remove two or more cylinders with combustion chamber distress if the engine has a T. S. O. of 1,100 hours or less. In addition to this we have limited all DC–6 cylinders to a total of 3,000 hours.

"(*f*) Periodic wheeze checking is suggested. * * *" "Compression checking, while more involved, is recommended as a more thorough and more valuable inspection." For nearly 3 years we have been performing periodic compression checks on the R–2800–CA15 engines as well as making compression checks at any time when engine roughness is suspected of being caused by leaking valves.

In addition to all of the above we have reduced cruise power 5 percent on the DC–4 and 5.5 percent on the DC–6 as of February 15, 1952. In brake horsepower, the DC–4 maximum cruise power has been reduced from 720 brake horsepower to 660 brake horsepower, the DC–6 from 1,200 brake horsepower low blower to 1,100 brake horsepower low blower and from 1,100 brake horsepower high blower to 1,000 brake horsepower high blower.

The lead content of our fuel is stated by our supplier to have increased from an average of 2.97 ml. to 3.96 ml. An anaylsis of fuel drawn from one of our aircraft shows a lead content of 3.98 ml.

Very truly yours,

NATIONAL AIRLINES, INC.,
G. T. BAKER, *President.*

MUNITIONS BOARD,
Washington 25, D. C., April 11, 1952.

DEAR MR. BECKWORTH: This is in further reply to your letter of March 4, 1952, concerning the tetraethyl lead (TEL) content of aviation gasoline and the effects thereof on engine performance.

The military specification for aviation gasoline allowing a maximum of 4.6 cubic centimeters of TEL per gallon has been in effect since 1943. Actual deliveries of such aviation gasoline to the military during the years 1950 to 1952 have had TEL content, generally, as follows:

Military grade 100/130.—Approximately 95 percent has had TEL content of from 4.0 to 4.6 cubic centimeters per gallon, of which over 60 percent has had TEL content of from 4.5 to 4.6 cubic centimeters per gallon.

Military grade 115/145.—100 percent of this grade has had TEL content of from 4.0 to 4.6 cubic centimeters per gallon of which 80 to 95 percent contained TEL between 4.5 and 4.6 cubic centimeters per gallon.

Air transport activities of the Department of Defense have had no experience in the use of a low TEL content fuel and thus no data are available on which to base conclusions as to the relative performance characteristics of high TEL content versus low TEL content fuels. Recognizing the need for maximum availability of aviation gasoline, the Department of Defense has made no effort to use lower lead content fuels.

To minimize lead fouling problems, several channels of approach have been followed. For example, operational instructions have been issued by the Military Air Transport Service (MATS) whereby under normal cruise conditions the engine primer will be employed for 1 minute each hour to clear the plugs as a preventative measure. Spark plug fouling in flight can be identified by torque fluctuation, rough engine, and backfiring. Where trouble is indicated, the engine primer is applied a second or third time. If the condition is not improved after approximately three attempts, it is considered indicative that the trouble is something other than spark plugs or that plugs are fouled beyond the point of recovery by "inflight" techniques.

Further, continuing studies are being made of improved types of spark plugs and high-frequency ignition systems as possible aids in reducing or eliminating spark plug fouling due to lead deposition.

Finally, the military have been conducting evaluation studies of various types of lead scavenger agents during the past 3 years. Tests containing these special fuel additives are progressing satisfactorily and, in one instance, the use of a new scavenger agent resulted in a 90 percent reduction in spark plug fouling and unscheduled spark plug removal rate. Another series of tests is now in progress to evaluate the effect of a slightly modified blend of the additive in minimizing spark plug fouling without causing any other adverse effects in the aircraft engines.

It is hoped that the above information will prove adequate. We shall be happy to furnish any additional information you may require.

Sincerely yours,

ALFRED H. JOHNSON.
Brigadier General, United States Air Force,
Chief, Office of Petroleum Programs.

Hon. LINDLEY BECKWORTH,
House of Representatives.

DEPARTMENT OF THE INTERIOR,
OFFICE OF THE SECRETARY,
Washington 25, D. C., March 3, 1952.

MY DEAR MR. WOLVERTON: You wrote to Mr. Bruce K. Brown on February 20, 1952, regarding the quality of fuels used by civil airlines, and again to me on February 23, 1952, requesting further information and various documents relating to PAD Orders No. 3 and 4. We are pleased to give you in this reply the information requested in both communications. Copies of the orders are attached as exhibit A.

You are no doubt aware that the Petroleum Administration for Defense does not assume responsibility for the quality of aircraft fuels delivered to the consumers. Purchase specifications for civil aircraft fuels, like other petroleum products, are normally determined between the supplier and purchaser, which, in this case, would be the airline operators. During the first few years following World War II, there were several changes made in both military and commercial aircraft fuel specifications. This, of course, was the first time that any substantial quantities of grade 100 and higher octane fuels were used by commercial operators. They had previously used 91 octane fuel. In general, these changes were directed toward obtaining improved performance, and especially in the case of commercial fuels toward lower engine maintenance costs. During this period, various forces were at work, and different groups, including the airline operators, engine builders, oil refiners, Government agencies, and others became involved to varying degrees in changing commercial aircraft

fuel specifications. Over a period of time, certain elements of these specifications, such as maximum tetraethyl lead content, were established at a level dictated by competition among the petroleum refiners for airline business. This resulted in a situation in which some airlines used exclusively 3.0 ml. maximum tetraethyl lead per gallon while others used 4.0 ml., or a combination of 4.0 and 3.0 ml. maximum, according to the origin of the flights. Apparently, airlines using 4.0 ml. tetraethyl lead did not consider that the increased maintenance or any of the other factors involved justified the use of the lower tetraethyl lead content fuel.

With the exception of maximum permissible tetraethyl lead content, specifications have generally become standardized for all commercial contracts. The American Society for Testing Materials, which is the recognized authority on standards for petroleum products, issued a tentative specification for aviation gasolines in 1947, ASTM Designation: D910–51T, Revised 1948 and 1950, 1951. This specification covers grades 91/98, 100/130, and 115/145. These specifications, modified to fit specific needs, are now in general use throughout the industry, and with the exception of the maximum permissible tetraethyl lead content for grades 91/98 and 100/130, are the equivalent of current military fuel specifications. A copy of the ASTM specification, exhibit B, is attached for your ready reference.

Fuels of the type used in the above specification, but containing a uniform tetraethyl lead content of 4.01 ml. per gallon, are now used for commercial operations at all airports throughout this country. For this reasons, we believe that neither the fuel composition, which is manufactured to meet specifications, nor the tetraethyl lead content of the fuels can have any effects which would be peculiar to the recent tragedies at Elizabeth, N. J.

The above discussion provides a brief general outline of the evolution of present day commercial aircraft fuel specifications. However, in addition to these grade specifications developed between the supplier and the consumer, certain minimum quality specifications for use in a particular aircraft are established by the Civil Aeronautics Administration. Briefly, the CAA sets up a minimum octane rating fuel for use in an aircraft engine based upon the minimum octane for which the particular type engine was designed and satisfactorily tested. Higher octane fuels are, of course, permissible. The airplane is conspicuously marked to indicate the minimum grade of fuel which may be used, and it is the responsibility of the supplier and the purchaser to see that the proper fuel is delivered to the airplane.

We are sure that the CAA would be glad to furnish you with details of their regulations regarding the quality of fuels which may be used by the airlines.

The Petroleum Administration for Defense is the Government agency responsible for the supplies of aviation fuel for the military and essential civilian uses. We, therefore, are obliged, in the discharge of these duties, to investigate all possible courses of action. It naturally follows that, when emergency shortages arise, any arbitrarily established specifications which restrict supplies must come under careful review.

The over-all supply and demand situation is periodically reviewed by PAD to determine the magnitude of additional production required. As of October 1, 1951, increased demands on the part of the military and the loss of 18,000 barrels per day of grade 100/130 from the Abadan Refinery in Iran resulted in an estimated shortage in the world-wide supply of high octane number aviation gasoline of 24,000 barrels per day. Inasmuch as approximately 90 percent of the high octane aviation gasoline production facilities in operation are in the United States, this country was called upon to fulfill that requirement normally satisfied by Abadan production. The majority of the product from that source went to commercial operations carried on by friendly foreign countries overseas and by the American airline operators in foreign areas. Actually, the loss of Abadan production dated back to late June, but operations were continued in foreign areas largely through depletion of stocks in storage. However, certain airline operations, particularly in the Far East, had been drastically reduced.

Until last October, it had been possible to provide adequate supplies of fuels by means of well-established procedures and without using allocation powers. On October 19, 1951, the Petroleum Administration for Defense issued PAD Order No. 4, placing a floor on the lead content of commercial aviation gasoline delivered for domestic consumption at 4.0 ml. per gallon and for export at 4.6 ml. per gallon. This action was taken to overcome a significant portion of the shortage of high octane number aviation gasoline mentioned above.

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In order to obtain additional supplies of aviation gasoline, the Petroleum Administration, at the same time, also issued PAD Order No. 3. This order required that alkylate and all other key blending components of a similar type required in the manufacture of high octane number aviation gasoline be reserved strictly for that use and required the use of all available raw materials for the production of alkylate, as directed by PAD, in order to insure maximum production of that vital aviation gasoline component.

The possibilities of placing a floor on the lead content of commercial aviation gasoline had been discussed with representatives of the airlines and their industry associations in the fall of 1950, when a shortage of somewhat lower magnitude was being faced. They presented, at that time, their objections to increasing the lead content of the fuel that they use to the military specification of 4.6 ml. per gallon. These were carefully considered. At that time, other means (which are still practiced) were available to increase production of aviation gasoline, and it was not necessary to take action in increasing TEL content. Copies of pertinent correspondence, including the requested transcript from the meeting of the National Petroleum Council on September 28, 1950, are attached as exhibit C.

The main objections which airline operators have to higher tetraethyl lead content arises from the fact that the addition of tetraethyl lead to motor fuels causes increased engine deposits. This is true for automotive as well as aircraft engines. Tetraethyl lead is a compound of lead and hydrocarbons which is vaporized or injected along with the fuel into the cylinders of the engine for the purpose of suppressing knock. Modern high output automotive and aircraft engines would not be operable with available fuels without the addition of tetraethyl lead. The fluid used contains scavenging agents which materially reduce but do not entirely eliminate engine deposits. The effect of these deposits must be offset by adequate engine maintenance practices, which, in the case of increased tetraethyl lead, generally means more frequent overhauls.

The use of high tetraethyl lead content fuels is not new. During World War II, all high octane military and commercial aircraft fuels contained 4.6 cubic centimeters TEL. With this TEL content, it was possible to meet the requirements of aviation fuels with limited supplies of alkylate. After the war, with large producing capacity for alkylate available, it was possible to replace a portion of the tetraethyl lead in commercial fuels with alkylate, and this actually occurred in many instances as previously pointed out. The main point here is that with the present type engines, we could never completely eliminate the use of tetraethyl lead, and that even though alkylate were not in short supply, it would be necessary to continue to use some tetraethyl lead in order to produce fuels which would perform satisfactorily. This, of course, means that we are discussing a degree of a situation, rather than any specific principle, and that, in any case, there exists the problem of deposits in engines as a possible result of tetraethyl lead.

Our position, when PAD Order No. 4 was issued in October 1951, was not arbitrary. The reports submitted to the Petroleum Administration during the previous year had shown that approximately 50 percent of the commercial airline operations in this country were then being conducted on fuel containing 4.0 ml. tetraethyl lead per gallon compared to 3.0 ml. for most of the remaining operations. A large portion of these operations was on the west coast, where the overall supply situation on aviation gasoline had been very tight and had forced individual refiners to supply higher lead content fuels in order to satisfy demand. This fact was discussed with the Civil Aeronautics Administration and Civil Aeronautics Board, and there were no data forthcoming from those agencies to indicate that any extraordinary operating problems were being encountered in that area from the use of 4.0 ml. tetraethyl lead fluid. This connotes that the Pacific airlift, as well as all commercial operations in that area, had been operating satisfactorily on fuel containing the higher lead content for at least a year.

In addition to the long standing use of considerable quantities of 4.0 ml. fuel in domestic commercial operations, at the time PAD Order No. 4 was introduced, approximately half of the aviation gasoline for export in the fourth quarter for commercial use in foreign areas was scheduled to contain 4.6 ml. of tetraethyl lead. In this connection, PAD has been informally advised by the military services, the high octane aviation gasoline of which specifies 4.6 ml. tetraethyl lead per gallon, that they never had an accident where tetraethyl lead was found to be a significant factor.

Additional discussions were held with representatives of the airlines, their industry associations, CAA, and CAB on October 23 and 25, 1951, to consider a request by CAB for a further delay in effecting an increase in TEL content of commercial aircraft fuels. In the face of the magnitude of the shortage of aviation gasoline existing at that time, we did not feel justified in delaying the effective date, October 30, of section 3 of PAD Order No. 4. Section 3 of PAD Order No. 4 relates to the TEL content of commercial aviation gasolines. It had been estimated that approximately 5,500 B/D of additional grade 100/130 aviation gasoline would be made available by the application of this order, which was a significant contribution toward relieving the over-all shortage. Copies of correspondence pertinent to the discussions held at that time are attached as exhibit D.

It has been agreed with representatives of the airlines that when additional information on this subject is available, meetings will be scheduled to exchange information on any additional operating problems that are incurred by this order, and on increased availability of aviation gasoline resulting from the application of the order. At this writing, no new information has been received, although certain correspondence, exhibit E attached, presents additional views on the use of 4.6 ml. fuel for foreign commercial uses.

The "defense against claims for damages" provision in PAD Order No. 4, to which you refer, was copied in almost the precise language of the Defense Production Act of 1950, as amended. (See sec. 707 of the Defense Production Act.)

PAD Order No. 4 applies only to the delivery of aviation gasoline and not to the purchase thereof. The purpose of this provision in this order was to eliminate existing contractual commitments between sellers and purchasers of such aviation fuels as were no longer permitted to be delivered under the order. This provision was not designed to affect the air carriers' responsibility, and we do not believe it would be any defense to the claims arising from the accidents to which reference is made.

In summarizing, it is important to describe the alternatives which were open to PAD in October 1951. The world-wide shortage of aviation gasoline was 24,000 barrels per day. A very small portion of this shortage could be obtained by the provisions of PAD Order No. 3, and other small increments could be obtained by marginal procedures not previously considered necessary. These steps were not sufficient to produce the supplies of aircraft fuels required for military and essential civilian use. There were then only three possible courses of action left open to PAD:

1. Ration civil aircraft fuels.
2. Restrict deliveries to the military.
3. Increase the tetraethyl lead content of civil aircraft fuels by issuing PAD Order No. 4.

Of the afore-mentioned alternatives, PAD considered PAD Order No. 4 as the least objectionable solution to the problem. We fully recognize the significance of increased tetraethyl lead in civil aircraft fuels, but our review of all the evidence led us to different conclusions as to the magnitude of the adverse effects predicted by the airline operators. For this reason, we were able to make the decision to proceed with PAD Order No. 4 with the full belief that it was in the national interest. It was also stated, at that time, that as soon as the supply of aviation gasoline was sufficient to meet the essential requirements from military and civilian sources the order would be immediately withdrawn. There are present indications that the supply position should be approximately in balance by the end of the third quarter of this year, and if there are no significant increases in demand, we believe that such action could be taken at that time.

In our desire to give you all of the information available to us on this subject, we are including as exhibit F a letter from Rear Adm. A. M. Pride, USN, Chief of the Bureau of Aeronautics, Department of the Navy, to Mr. H. A. Stewart, dated October 19, 1950, which is classified as "Security—Confidential."

Sincerely yours,

OSCAR L. CHAPMAN,
Secretary of the Interior and Petroleum Administrator.

HON. CHARLES A. WOLVERTON,
House of Representatives,
Washington, D. C.

EXHIBIT A

COPIES OF PAD ORDERS NOS. 3 AND 4

[Petroleum Administration for Defense—PAD 174]

PAD ISSUES TWO ORDERS TO BOOST SUPPLY OF AVIATION GASOLINE

Moving to meet a serious shortage of aviation gasoline, the Petroleum Administration for Defense today issued two orders designed to step up output of the product.

One of the orders (PAD Order No. 3):

(1) Prohibits the use of alkylate and certain other blending agents in anything but aviation gasoline.

(2) Requires the use of available raw materials for production of alkylate, as directed by PAD, in order to insure maximum production of this vital aviation gasoline component.

The other order (PAD Order No. 4) puts a floor on the amount of tetraethyl lead (TEL) that may be used in the manufacture of aviation gasoline.

Both orders were signed by Secretary of the Interior Oscar L. Chapman, Petroleum Administrator for Defense.

Aviation gasoline recently has come into short supply largely for two reasons, Deputy Petroleum Administrator Bruce K. Brown explained:

1. Military requirements, both domestic and foreign, have increased considerably beyond the program planned earlier this year.

2. Shutdown of the Abadan refinery in Iran last June has imposed a new demand for 18,000 barrels a day of aviation gasoline on United States refineries.

"PAD's staff has weighed all foreseeable demands for aviation gasoline," Mr. Brown said. "It was obvious that unless something were done we would face a serious shortage for the rest of 1951. Projected expansion in the military aircraft program will make the shortage even more acute in 1952.

"Through the regulation of alkylate use and restrictions on the use of such feed stocks as isobutane, butylene, and propylene, we expect to obtain a significant increase in aviation gasoline output. By increasing required TEL use in civilian aviation gasoline, we expect to obtain immediately a further increase in aviation gasoline supplies."

Alkylate is a top-quality gasoline made from a combination of several of the lighter parts of petroleum. Tetraethyl lead is a chemically compounded fluid. Both are essential to raise the octane ratings of aviation gasoline.

Mr. Brown pointed out that the volume of aviation gasoline produced depends entirely upon the amount of alkylate available for blending and that at present the supply of alkylate is extremely tight. An increase in use of TEL will stretch the available supply of alkylate, he said.

Under PAD Order No. 4, refineries will be required to use not less than 4 cubic centimeters of tetraethyl lead in each gallon of civilian domestic aviation gasoline of the higher grades and not less than 4.6 cubic centimeters in each gallon of the higher grades of aviation gasoline for export.

To the extent that commercial airlines must use grade 108/135 aviation gasoline, Mr. Brown said, exceptions will be granted under PAD Order No. 4, upon application to PAD. Fuel of this grade is required, Mr. Brown explained, for some large commercial aircraft.

"There are those who claim that an increase in the lead content of aviation gasoline will cause operating difficulties. It is true that gasoline with a 4-cubic-centimeter lead content will cause more engine-deposit problems than one with only a 3-cubic-centimeter content. Yet the fact is that about one-half of all the commercial aviation gasoline produced for some time has had 4 cubic centimeters of lead," Mr. Brown said.

Increase in the TEL use for aviation gasoline will affect only about 1 percent of the present supply of the fluid, Mr. Brown said.

Texts of the two orders issued today, together with a series of questions and answers about the application of PAD Order No. 3 are attached.

TITLE 32A—NATIONAL DEFENSE, APPENDIX

CHAPTER IX—PETROLEUM ADMINISTRATION FOR DEFENSE, DEPARTMENT OF THE INTERIOR

PAD ORDER NO. 3

AVIATION QUALITY BLENDING AGENTS AND FEED STOCKS

This order is found necessary and appropriate to promote the national defense and is issued pursuant to the Defense Production Act of 1950, as amended. In the formulation of this order consultation with industry representatives has been rendered impracticable due to the need for immediate action.

Sec.

1. What this order does.
2. Definitions.
3. Restrictions on use of blending agents.
4. Restrictions on use of feed stocks.
5. Blending finished aviation gasoline for maximum production.
6. Instructions.
7. Application for adjustments.
8. Records and reports.
9. Communications.
10. Defense against claims for damages.
11. Violations.
12. Effective date.

AUTHORITY: Sections 1 through 13 issued under Section 704, 64 Stat. 816, as amended; 50 U. S. C. App. Supp. 2154. Interpret or apply Sec. 101, 64 Stat. 799, as amended; 50 U. S. C. App. Supp. 2071; Sec. 101, E. O. 10161, Sept. 9, 1950, 15 F. R. 6105; Sec. 2, E. O. 10200, Jan. 3, 1951, 16 F. R. 61; DPA Delegation 1, Jan. 24, 1951, 16 F. R. 738, as amended May 15, 1951, 16 F. R. 4594; NPA Delegation 9, Feb. 26, 1951, 16 F. R. 1908; Interior Del. Order 2591, Oct. 3, 1950, 15 F. R. 6767, as amended Dec. 21, 1950, 15 F. R. 9529, Jan. 29, 1951- 16 F. R. 932, Mar. 27, 1951, 16 F. R. 2896.

SEC. 1. *What this order does.*—The purpose of this order is to make continuously available, for military and other essential uses, an increased supply of aviation gasoline to satisfy the increased requirements of the national defense program. The order restricts the use, delivery, and receipt of certain blending agents and feed stocks usable in the manufacture of aviation gasoline in order to assure their utilization in the manufacture of aviation gasoline to the maximum extent practicable. Because of the technical character of the subject matter of this order, it is important that the definitions be carefully read and be borne in mind in reviewing the other provisions of this order.

SEC. 2. *Definitions.*—(*a*) "Person" means any individual, corporation, partnership, association, or any other organized group of persons, or legal successor or representative of the foregoing, and includes the United States or any agency thereof, or any other government, or any of its political subdivisions, or any agency of the foregoing.

(*b*) "Refiner" means any person who is engaged in any operation directly incident to the processing, reprocessing, or alteration of petroleum, including but not limited to compounding or blending, including the extraction or recovery of natural gasoline or associated hydrocarbons.

(*c*) "Blending agent" means any of the following: Alkylate, hydrocodimer, or di-isopropyl.

(*d*) "Aviation quality blending agent" means a blending agent (as defined in paragraph (*c*) of this section 2) having such physical and chemical characteristics as to make it suitable for inclusion directly in a fuel for the operation of reciprocating engines for aircraft.

(*e*) "Finished aviation gasoline" means a fuel, suitable for use in reciprocating engines for aircraft, which will not normally be further processed, treated, or altered.

(*f*) "Feed stock" means any of the following: Isobutane, butylene, propylene, pentylene or polymer, or any combination of any such material, which is of a quality suitable for use in the manufacture of a blending agent.

(*g*) "Manufacture" means any of the following: Processing, producing, altering, extracting, recovering, compounding, blending, or the like.

SEC. 3. *Restrictions on the use of blending agents.*—(*a*) No refiner shall use any aviation-quality blending agent, or deliver or receive any aviation-quality blending agent for use, other than in the manufacture of finished aviation gasoline, except as expressly permitted by PAD pursuant to section 7 of this order.

(*b*) No refiner shall use any other blending agent, or deliver or receive any other bending agent for use, other than in the manufacture of an aviation-

quality blending agent, except as expressly permitted by PAD pursuant to section 7 of this order.

SEC. 4. *Restrictions on use of feed stocks.*—(*a*) No refiner shall use any feed stock, or deliver or receive any feed stock for use, other than in the manufacture of a blending agent, except as provided in any of paragraphs (*b*), (*c*), (*d*), or (*e*) of this section 4 or except as expressly permitted by PAD pursuant to section 7 of this order.

(*b*) The provisions of paragraph 4 (*a*) do not apply to the extent that (1) a specific feed stock is not of a quality satisfactory for the refiner's direct use in the manufacture of a blending agent, and (2) the refiner does not possess facilities at the location of such feed stock having capacity available with which a feed stock of such satisfactory quality can and would customarily be manufactured from such feed stock, and (3) the refiner has not received written instructions from PAD to deliver such feed stock to another refiner or manufacturing location.

(*c*) The provisions of paragraph 4 (*a*) do not apply to the extent that (1) a specific feed stock cannot be utilized by the refiner in the manufacture of a blending agent in his facilities at the location of such feed stock because another feed stock needed therefor is not available to the refiner at the same location, and (2) the refiner has not received written instructions from PAD to deliver such feed stock to another refiner or manufacturing location.

(*d*) The provisions of paragraph 4 (*a*) do not apply to the extent that (1) the refiner does not possess facilities at the location of a specific feed stock having capacity available with which to manufacture a blending agent from such feed stock, and (2) the refiner has not received written instructions from PAD to deliver such feed stock to another refiner or manufacturing location.

(*e*) The provisions of paragraph 4 (*a*) do not apply to the extent that a specific feed stock is used, or delivered or received for use, in the manufacture of synthetic rubber or chemicals.

SEC. 5. *Blending finished aviation gasoline for maximum production.*—Every refiner shall use reasonable diligence to make use of aviation-quality blending agents available to him in such manner as to assure manufacture of the maximum quantity of finished aviation gasoline of the grade or grades being manufactured.

SEC. 6. *Instructions.*—Instructions issued by the Petroleum Administration for Defense, pursuant to provisions of this order, shall provide information as to the delivery, use, or other action to be taken by the person affected, and shall give the effective date on or after which such action is required.

SEC. 7. *Application for adjustments.*—Any person affected by any provision of this order may file a request for adjustment or exception upon the ground that any provision of this order works undue or exceptional hardship upon him not suffered generally by his competitors, or others similarly situated, in the same trade or industry, or that its application to him would not be in the interest of national defense or the public interest. Each request shall be in writing and shall set forth all pertinent facts and the nature of the relief sought and shall state the justification therefor. An original and two copies of each request shall be submitted.

SEC. 8. *Records and reports.*—(*a*) Each person covered by this order shall retain in his possession for at least 2 years records in sufficient detail to permit an audit to determine that the provisions of this order have been met. This does not specify any particular accounting method and does not require alteration of the system of records customarily maintained, provided such records supply an adequate basis for audit. Records may be maintained in the form of microfilm or other photographic copies instead of the originals.

(*b*) All records required by this order shall be made available, at the usual place of business where maintained, for inspection and audit by duly authorized representatives of the Petroleum Administration for Defense.

(*c*) Persons subject to this order shall make such records and submit such reports to the Petroleum Administration for Defense as it shall require, subject to the terms of the Federal Reports Act of 1942 (56 Stat. 1078, 5 U. S. C., secs. 139–139f).

SEC. 9. *Communications.*—All communications concerning this order shall be addressed to the Petroleum Administration for Defense, Department of the Interior, Washington 25, D. C., Reference: PAD Order No. 3.

SEC. 10. *Defense against claims for damages.*—No person shall be held liable for damages or penalties for any act or failure to act resulting directly or indirectly from his compliance with this order, or amendments thereto, so long as

this order and its amendments shall remain in force, notwithstanding that this order, or any amendment thereto, or any part thereof, shall hereafter be declared invalid by judicial or other competent authority.

SEC. 11. *Violations.*—Any person who willfully violates any provision of this order, or who willfully conceals a material fact or furnishes false information in the course of operation under this order, is guilty of a crime and upon conviction may be punished by fine or imprisonment, or both. Administrative action may be taken against such person to suspend his privilege of making or receiving further deliveries of materials or using facilities under priority or allocation control and to deprive him of further priorities assistance.

SEC. 12. *Effective date.*—This order is issued this 19th day of October 1951, and shall be effective on and after the date of issuance: *Provided*, That the provisions of section 3 of this order shall not take effect until 3 a. m., eastern standard time, on the 30th day of October 1951, and *Provided further*, That the provisions of section 4 of this order shall not take effect until 3 a. m., eastern standard time, on the 19th day of November 1951.

OSCAR L. CHAPMAN,
Secretary of the Interior and Petroleum Administrator for Defense.

TITLE 32A—NATIONAL DEFENSE, APPENDIX

CHAPTER IX—PETROLEUM ADMINISTRATION FOR DEFENSE, DEPARTMENT OF THE INTERIOR

PAD ORDER NO. 4

AVIATION GASOLINE SPECIFICATIONS

This order is found necessary and appropriate to promote the national defense and is issued pursuant to the Defense Production Act of 1950, as amended. At the time of the formulation of this order, consultation with industry representatives was rendered impracticable due to the need for immediate action. However, the subject matter of the order has been under consideration for some time and representatives of the aviation industry and interested Government agencies have previously been provided opportunity to present their views and consideration has been given to their recommendations.

Sec.
1. What this order does.
2. Definitions.
3. Aviation gasoline specifications.
4. Application for adjustments.
5. Records and reports.
6. Communications.
7. Defense against claims for damages.
8. Violations.
9. Effective date.

AUTHORITY: Sections 1 through 9 issued under Section 704, 64 Stat. 816, as amended; 50 U. S. C. App. Supp. 2154. Interpret or apply Sec. 101, 64 Stat. 799, as amended; 50 U. S. C. App. Supp. 2071; Sec. 101, E. O. 10161, Sept. 9, 1950, 15 F. R. 6105; Sec. 2, E. O. 10200, Jan. 3, 1951, 16 F. R. 61; DPA Delegation 1, Jan. 24, 1951, 16 F. R. 738, as amended May 15, 1951, 16 F. R. 4594; NPA Delegation 9, Feb. 26, 1951, 16 F. R. 1908; Interior Dept. Order 2591, Oct. 3, 1950, 15 F. R. 6767, as amended Dec. 21, 1950, 15 F. R. 9529, Jan. 29, 1951, 16 F. R. 932, Mar. 27, 1951, 16 F. R. 2896.

SEC. 1. *What this order does.*—This order sets forth the minimum quantities of tetraethyl lead that may be included in commercial aviation gasoline. Specifications of this nature are required in order that larger quantities of gasoline blending stocks can be utilized in the manufacture of commercial aviation gasoline. In turn, this will result in an increase in total supplies of aviation gasoline needed immediately for military and other essential uses.

SEC. 2. *Definitions.*—(*a*) "Person" means any individual, corporation, partnership, association, or any other organized group of persons, or legal successor or representative of the foregoing, and includes the United States or any agency thereof, or any other government, or any of its political subdivisions, or any agency of the foregoing.

(*b*) "ml" means milliliter.

(*c*) "TEL" means tetraethyl lead.

(*d*) "Commercial aviation gasoline" means all finished aviation gasoline not specifically blended, or manufactured, for military purposes.

SEC. 3. *Aviation gasoline specifications.*—(*a*) No person may deliver any grade of commercial aviation gasoline which contains less than 4.6 ml of TEL per gallon, except—

(1) Commercial aviation gasoline which as of the date of this section 3 takes effect is located at, or is in transit to, a point of distribution other than the point of manufacture; or

(2) Such other commercial aviation gasoline to the extent that delivery or receipt is expressly permitted by paragraph (*b*) of this section 3; or

(3) As expressly permitted by PAD pursuant to section 4 of this order.

(*b*) A person may deliver—

(1) Commercial aviation gasoline of grade 80 if such gasoline contains not less than 0.5 ml of TEL per gallon; or

(2) Commercial aviation gasoline for use by aircraft when operating within or departing from the United States, of grades other than grade 80, if such gasoline contains not less than 4.0 ml of TEL per gallon.

SEC. 4. *Application for adjustments.*—Any person affected by any provision of this order may file a request for adjustment or exception upon the ground that any provision of this order works undue or exceptional hardship upon him, not suffered generally by his competitors, or others similarly situated, in the same trade or industry, or that its application to him would not be in the interest of national defense or the public interest. Each request shall be in writing and shall set forth all pertinent facts and the nature of the relief sought and shall state the justification therefor. An original and two copies of each request shall be submitted.

SEC. 5. *Records and reports.*—(*a*) Each person covered by this order shall retain in his possession for at least 2 years records in sufficient detail to permit an audit to determine that the provisions of this order have been met. This does not specify any particular accounting method and does not require alteration of the system of records customarily maintained, provided such records supply an adequate basis for audit. Records may be maintained in the form of microfilm or other photographic copies instead of the originals.

(*b*) All records required by this order shall be made available, at the usual place of business where maintained, for inspection and audit by duly authorized representatives of the Petroleum Administration for Defense.

(*c*) Persons subject to this order shall make such records and submit such reports to the Petroleum Administration for Defense as it shall require, subject to the terms of the Federal Reports Act of 1942 (56 Stat. 1078, 5 U. S. C., secs. 139–139f).

SEC. 6. *Communications.*—All communications concerning this order shall be addressed to the Petroleum Administration for Defense, Department of the Interior, Washington 25, D. C., Reference: PAD Order No. 4.

SEC. 7. *Defense against claims for damages.*—No person shall be held liable for damages or penalties for any act or failure to act resulting directly or indirectly from his compliance with this order, or amendments thereto, so long as this order and its amendments shall remain in force, notwithstanding that this order, or any amendment thereto, or any part thereof, shall hereafter be declared invalid by judicial or other competent authority.

SEC. 8. *Violations.*—Any person who willfully violates any provision of this order, or who willfully conceals a material fact or furnishes false information in the course of operation under this order, is guilty of a crime and upon conviction may be punished by fine or imprisonment, or both. Administrative action may be taken against such person to suspend his privilege of making or receiving further deliveries of materials or using facilities under priority or allocation control and to deprive him of further priorities assistance.

SEC. 9. *Effective date.*—This order is issued this 19th day of October 1951, and shall be effective on and after the date of issuance: *Provided*, That the provisions of section 3 of this order shall not take effect until 3 a. m. eastern standard time on the 30th day of October 1951.

OSCAR L. CHAPMAN,
Secretary of the Interior and Petroleum Administrator for Defense.

[Petroleum Administration for Defense—PAD 175]

OCTOBER 19, 1951.

QUESTIONS AND ANSWERS ABOUT PAD ORDER NO. 3 MADE PUBLIC

The Petroleum Administration for Defense today made public the following questions and answers dealing with the application of PAD Order No. 3:

QUESTIONS AS TO TERMS USED IN THE ORDER

1. Q. Who is a "refiner" under the order?

A. A refiner is anybody who is engaged in any operation directly incident to the processing, reprocessing, or alteration of petroleum, including the extracting or recovery of natural gasoline. This definition includes operators of natural-gasoline plants as well as operators of refineries.

2. Q. What does "blending agent" mean?

A. Blending agent means alkylate, hydrocodimer or di-isopropyl. An "aviation quality blending agent" is a blending agent as defined, which has such physical and chemical characteristics as to make it suitable for inclusion directly in a fuel for the operation of reciprocating engines for aircraft.

3. Q. What does "feed stock" mean?

A. Feed stock is narrowly defined. Under the order it means isobutane, butylene, propylene, pentylene, or polymer, or any combination of these, which is of a quality suitable for use in the manufacture of alkylate, hydrocodimer or di-isopropyl.

4. Q. When the order speaks of "manufacture," does it include such operations as blending and compounding?

A. Yes. Manufacture is defined in the order as including processing, producing, altering, extracting, recovering, compounding, blending or the like.

QUESTIONS APPLYING TO MANUFACTURERS OF FINISHED AVIATION GASOLINE

1. Q. If I am currently using any alkylate in the manufacture of a fuel other than finished aviation gasoline, must I stop doing so?

A. Yes, unless an exception is obtained from PAD.

2. Q. Does this order have anything to do with the use of aromatics, catalytic base stocks, isopentane, or any other components except blending agents that are normally used in blending finished aviation gasoline?

A. No; except to the extent that the refiner can, with reasonable diligence, use any of such available materials to maximize his production of any grade or grades of finished aviation gasoline.

3. Q. If I am currently polymerizing any feed stocks and the polymer is not going to the manufacture of blending agents and I have available alkylation capacity, must I reduce the polymerization operation to the extent necessary to fill up my alkylation capacity?

A. Yes, if you are not relieved of that obligation under any of paragraphs b, c, d or e of section 4 or have not obtained an exception from PAD.

4. Q. If I have facilities and feed stocks capable of producing more blending agents that I can use in the manufacture of finished aviation gasoline because of limited blending facilities or lack of other necessary blending components at that location, what am I to do?

A. Notify PAD of the quantity, quality, and location of additional blending agents that you can produce and request relief from the provisions by which you are affected until arrangements can be made for the proper use of such blending agents.

5. Q. If I have no purchaser for the finished aviation gasoline that I can manufacture, what am I to do?

A. Notify PAD of the quantity and grades of aviation gasoline that can be produced and request relief. PAD will either arrange for a purchaser for the gasoline or grant exceptions from the provisions by which you are affected until a purchaser is provided.

6. Q. If my aviation gasoline product storage is full and no facility for taking delivery has been provided by my purchaser, what am I supposed to do about the alkylate that I normally blend into the aviation gasoline?

A. Notice of such a situation and a request for relief should be submitted to PAD as many days as possible before storage facilities will be full. You

should continue to accumulate receipts for production of alkylate in intermediate storage until full. Then you should request PAD to grant an exception from section 3 (a) until delivery is taken by your purchaser.

QUESTIONS APPLYING TO MANUFACTURERS OF ALKYLATE

1. Q. Am I required to manufacture aviation gasoline from the alkylate I produce?

A. No; but if you do not manufacture aviation gasoline, you may not make any other use except to sell the alkylate to another refiner who will manufacture finished aviation gasoline from it, unless you have obtained an exception from PAD. However, any refiner who produces alkylate presumably will find it to his economic advantage to manufacture finished aviation gasoline from his alkylate production.

2. Q. What responsibility do I have to make sure that the recipient of any blending agent delivered by me will use such blending agent in accordance with section 3?

A. You should require the recipient to advise you in writing that such is his intended use. If the delivery is made on written instructions from PAD, you would not be expected to obtain any other written assurance of the proper use of the blending agent.

3. Q. What is the responsibility of a refiner who is currently making alkylate that is unsuitable for aviation gasoline and who has no means of making the alkylate *suitable for such purpose*?

A. He should request an exception from section 3 (b) from PAD until such time of the blending agent can either be made into an aviation-quality blending agent or be delivered to another refiner or manufacturing location with capacity for finishing the blending agent.

4. Q. If I am now operating my alkylation facilities at full capacity but have surplus alkylation feed stocks, may I continue using such surplus feed stocks as I have in the past?

A. Yes, until such time as PAD issues written instructions to deliver such surplus feed stocks to another refiner or manufacturing location.

5. Q. I have spare alkylation capacity and surplus feed stocks, but they are at different refinery locations. What am I required to do about this situation under section 4?

A. Nothing, until such time as PAD instructs you to deliver the feed stocks to another refiner or manufacturing location.

6. Q. If I am manufacturing a blending agent but do not possess facilities at the same location having capacity available to produce a blending agent of aviation quality, must I continue to produce a blending agent from my feed stocks?

A. No; but if you discontinue the operation you may not make any other use of such feed stocks except to sell them to another refiner for use in the manufacture of a blending agent, unless an exception has been granted by PAD. However, the refiner presumably will find it to his economic advantage to continue the operation and either provide facilities required for finishing his blending agent to aviation quality or sell the blending agent to another refiner who will manufacture an aviation quality blending agent.

7. Q. Assuming the same conditions as in question 6, may I use such blending agent in motor gasoline?

A. No, unless an exception is granted by PAD.

8. Q. If I possess additional facilities which can be rehabilitated or otherwise adapted for the manufacture of a blending agent and I have available feed stocks, how am I affected by this order?

A. The order does not require you to rehabilitate or otherwise adapt such facilities for blending-agent manufacture, and you are not affected by the order unless you receive instructions from PAD to deliver such feed stocks to another refiner or manufacturing location.

MISCELLANEOUS QUESTIONS

1. Q. I am a producer of virgin naphtha that may be suitable for aviation gasoline blending. Am I affected by PAD Order No. 3?

A. No, if you do not produce finished aviation gasoline.

2. Q. I do not have an alkylation or hydrocodimer plant, nor do I blend aviation gasoline. What am I required to do by this order?

A. Nothing. But if you have a feed stock suitable for the manufacture of a blending agent, you may be instructed by PAD to deliver such material to another refiner for manufacture of a blending agent.

3. Q. I operate a natural-gasoline plant and produce isobutane. Am I required by this order to take any action?

A. No. You are not immediately affected by the order if you do not have facilities for the manufacture of a blending agent at the same location. However, you may be instructed by PAD to deliver the isobutane to another refiner for manufacture of a blending agent.

4. Q. I operate a natural-gasoline plant and either produce or have the facilities for producing isopentane suitable for use as a vapor pressure corrector in aviation gasoline. Am I affected by this order?

A. No, unless you manufacture finished aviation gasoline at the same location.

5. Q. I have a cracking unit that produces olefins and isobutanes, but do not have facilities at the same location for the manufacture of a blending agent. How am I affected by this order?

A. You are not affected unless the olefins and isobutanes as normally recovered by you are suitable for manufacture of a blending agent. Even then, no action is required of you unless PAD instructs you to deliver the material to a manufacturer of a blending agent.

6. Q. Does this order require production of aviation base stock with cracking facilities which are currently being used in the manufacture of motor gasoline?

A. No.

7. Q. At certain times I make small quantities of grade 91/98 aviation gasoline, but no blending agent is used in the manufacture. How am I affected by this order?

A. You are not affected by this order with respect to the manufacture of finished aviation gasoline unless blending agents are used in one or more of the grades being manufactured. If blending agents are used, you must use reasonable diligence to make maximum quantities of aviation gasoline.

EXHIBIT C

Item No. 1.—A letter from Milton W. Arnold, vice president (operations and engineering), Air Transport Association of America, dated September 21, 1950, and addressed to Mr. H. A. Stewart, Director of the Fuel and Oil Division, Department of the Interior, regarding the changing from commercial-fuel specifications to military-fuel specifications.

Item No. 2.—A letter from D. C. Ramsey, president of the Aircraft Industries Association of America, Inc., dated September 22, 1950, to Mr. H. A. Stewart, Director, Oil and Gas Division, Department of the Interior, also regarding changing specifications of aviation fuel.

Item No. 3.—A letter from Josh Lee, Acting Chairman of the Civil Aeronautics Board, dated September 26, 1950, same subject, and addressed to Secretary of the Interior Oscar L. Chapman.

Item No. 4.—A letter from Milton W. Arnold, vice president (operations and engineering), Air Transport Association of America, dated September 27, 1950, addressed to Maj. J. R. Parten, of the Department of the Interior, outlining the effects to commercial airlines of a change of fuel specifications from commercial to military.

Item No. 5.—Excerpt from stenographic transcript of National Petroleum Council meeting held on September 28, 1950, covering statement of Delos Wilson Rentzel, Chairman of the Civil Aeronautics Board.

Item No. 6.—Letter from Mr. H. A. Stewart, Acting Deputy Administrator, Petroleum Administration for Defense, dated October 18, 1950, and addressed to Dr. Addison M. Rothrock, Assistant Director for Research, National Advisory Committee for Aeronautics, requesting comments from the committee on the afore-mentioned subject.

Item No. 7.—Letter from Maj. Gen. W. E. Farthing, USAF, Director, Maintenance, Supply and Services, Office, Deputy Chief of Staff (Matériel), to Mr. H. A. Stewart, Acting Deputy Administrator, PAD, on December 19, 1950, in reply to Mr. Stewart's letter of October 5, 1950, relative to commercial airline difficulties when using military specification fuel.

AIR TRANSPORT ASSOCIATION OF AMERICA,
Washington, D. C., September 21, 1950.

Mr. H. A. STEWART,
Director, Fuel and Oil Division, Department of Interior,
Washington, D. C.

DEAR MR. STEWART: The Air Transport Association has been advised by the Fuel and Oil Division of the Department of Interior that a shortage in aviation fuel exists and will continue for an indefinite period. To alleviate this shortage, the airline industry is requested to change from commercial-fuel specifications to MIL–F–5572. The major differences between these two specifications which have drastic effects upon the airlines are (1) an increase in lead content from 3.0 to 4.6 cubic centimeters per gallon and (2) lowering the volatility of the fuel. These changes are in direct conflict with the fuel specifications which the airlines and engine manufacturers have endeavored for years to obtain, and the airline industry cannot accept this change without first ascertaining that every other feasible source has been tapped. A meeting of qualified airline personnel was called in Washington on September 20 to discuss the effects these changes will have upon the entire airline operating economy, maintenance, and safety record. The following organizations were represented:

All American Airways	Air Transport Association
American Airlines	Bendix Products Division
Capital Airlines	Chandler-Evans Division
Eastern Airlines	General Electric Co.
Northwest Airlines	Pratt & Whitney Aircraft
Pan American World Airways	Simmonds Aerocesories, Inc.
Trans-World Airlines	Thompson Products
United Air Lines	Wright Aeronautical Corp.
Aircraft Industries Association	

The representatives were informed concerning the details of the problem by the Department of the Interior. After careful review of the various factors affected by the proposed changes, it was the unanimous opinion of this meeting that these changes will—

(1) Considerably increase the hourly or per mile fuel consumption and consequently reduce the available fuel stocks in direct proportion.

(2) Seriously reduce the number of flying hours with the available commercial airplanes and consequently reduce the airlift capacity for national defense.

(3) Reduce the excellent safe operating record for which the airlines have energetically striven during the past 25 years.

(4) Greatly increase manpower required for adequate maintenance of engines and increase the requirements for spare engines and engine parts.

The following brief discussion of the above items represents the best considered estimates based on immediately available data and experience.

FUEL CONSUMPTION

Volatility and lead content are of prime importance in fuel consumption. The reduction of volatility in the military specifications produces maldistribution of fuel to the cylinders in conventional carburetor engines, resulting in starvation of fuel to certain cylinders. This effect is somewhat less pronounced in engines equipped with spinner injection and does not materially affect engines with direct injection. The large percentage of engines used throughout the industry will be thus affected. This starvation causes loss of power and frequent detonation. To overcome the results of this inferior distribution by low-volatility fuel, an over-all enrichment of engine carburetion is required. The enrichment for conventional carburetor engines will be 8 percent to 10 percent, enrichment for spinner injection engines will be 3 percent to 5 percent, and the enrichment for direct injection engines, which is a small percentage of the total number, is negligible.

Increased lead content of the military specification will require increased carburetor enrichment and consequent increased fuel consumption to overcome increased incidence of spark-plug fouling at normal cruising with lean mixtures. From tests and service experience increased fuel consumption to overcome this difficulty will amount to about 10 percent using 4 cubic centimeter lead content and approximately 15 percent for a 4.6 cubic centimeter lead content. We have been informed by representatives from the Interior Department that commercial consumption is approximately 46,000 barrels per day and that,

by changing the fuel specifications, a gain of 10,000 barrels per day of additional grade 100/130 would be obtained for military consumption. It is our contention that 60 percent to 70 percent of the potential anticipated gain will not be realized because of the necessity of enriching mixtures causing increased consumption if the present volume of commercial operations is maintained.

MAINTENANCE DIFFICULTIES

The proposed change in fuel specifications will cause a marked decrease in the hours of engine-overhaul period and consequently an increase in the number of overhauls required for a year's operation. This reduction in engine overhaul life will vary with various engine types from about 16 percent to about 50 percent depending upon the engine tolerance to the increase lead sludging and to the other adverse effects created by changing fuel volatility. From past experience with this type of fuel, we expect an increase in valve failures, valve-guide wear, cylinder and piston difficulties, and a great reduction in plug life compared to standards being presently maintained on commercial fuel specifications.

The added mechanical difficulties and reduced engine-overhaul period will increase, requiring manpower to handle the additional maintenance and will require expanded maintenance-shop facilities and higher inventory of spare parts. The number of spare engines required will be increased by 20 to 25 percent to compensate for the more rapid turn-over and lower overhaul time in order to maintain fleet operating efficiency. Service experience with increased lead content indicates an increase in spark-plug removals of between 65 percent and 75 percent, and an increase in premature engine removals by about 75 percent over the present rate.

The above considerations will decrease available plane hours by about 15 percent under the present scheduling practices. With increased tightening of schedules which can be anticipated under an emergency, the effect will be accentuated, and the loss of available plane-hours will be even higher. This loss, we believe, will be so detrimental to the national welfare that the contemplated gains in military high-octane fuel will be completely counteracted

SAFETY ASPECTS

The change in fuel specifications will adversely affect the high safety standards presently attained in airline operation. The various failures enumerated under "Maintenance difficulties" will immediately increase in-flight engine failures. Increase plug fouling from lead deposits of the 4.6-cubic-centimeter lead content will cause more engine failures at the critical point during take-off as well as also increasing valve and piston failures. Furthermore, the increased plug difficulties will cause more hours of one-cylinder-out operation which has a direct bearing on the propeller and propeller-hub-fatigue problem. The industry cannot afford to countenance any condition which will cause increased propeller failures. Exactly what steps could be taken to counteract this effect in case the airlines are forced to use higher lead content is not immediately evident.

The proposed increase in lead content will increase lead sludge deposits in the engine. Past experience indicates a repetition of hydromatic propeller actuation difficulties caused by sludge deposits and a great increase of plugged small oil passages, especially nose-case passages to the torquemeters. Several postwar airplanes are dependent upon correct torquemeter functioning during take-off to actuate auto-feathering in case of engine failure, and malfunctioning of the torquemeter will cancel a scheduled departure. We can expect a great increase in this type of difficulty within 200 hours after commencing the use of high-lead-content fuel. Excess sludge deposits in the crankcase have also been responsible for several types of bearing failures and clogging of two-speed supercharger clutches. We can anticipate a great increase in this type of difficulty with the proposed fuel specification.

For the above-stated reasons, we believe the proposed change will have an over-all detrimental effect on commercial air transportation which will completely wipe out the anticipated gains in military high-octane fuel availability and that this measure should not be resorted to until all other sources have been exploited completely.

Since the change in specifications of aviation fuel for commercial aviation would, in our opinion, result in a very small net increase in the output of aviation stocks, and, due to adverse effect on the aviation industry as described above, we recommend that this approach for eliminating the defficiency not be

considered; but that the deficiency should be made up from one or a combination of two methods:

A modification of existing catalytically cracking processes to obtain aviation gasoline stock instead of motor fuel stock and/or the lowering the present octane rating of motor fuel from 90-octane premium, 80 regular, to 75 and 70, respectively. In our opinion, the use of one or combination of either of the above methods would not require gas rationing nor would it greatly affect the supply of motor fuel for the public.

Sincerely yours,

MILTON W. ARNOLD,
Vice President, Operations and Engineering.

AIRCRAFT INDUSTRIES ASSOCIATION OF AMERICA, INC.,
Washington, D. C., September 22, 1950.

Mr. H. A. STEWART,
Director, Oil and Gasoline Division,
Department of the Interior,
Washington, D. C.

DEAR MR. STEWART: We have been advised by the Department of the Interior that a shortage of aviation fuel exists, and will continue to exist for some time to come. It is understood that in order to overcome the present shortage the commercial airlines will be requested to change from commercial-fuel specifications to existing military specifications, thus increasing the lead content and lowering the volatility of fuel available to them.

In this connection we would like to indicate that the problems in equipment operation pointed out by the Air Transport Association in their letter to you September 21 are supported by the test and operational experience of the manufacturers represented by this association. It is our opinion that the facts as presented by the Air Transport Association are likewise supported by experience of our equipment manufacturers in military operations of engines similar to those in use by the commercial airlines.

We would urge full consideration by your Division of the Air Transport Association letter with a view toward investigation of other means of alleviating the aviation-gasoline shortage than the methods currently under consideration by the Department of Interior. We believe that the proposal to require commerical-airline usage of military-specification fuel will seriously jeopardize our ability to maintain an adequate safe commercial airlift for the national defense and the civilian economy.

Sincerely yours,

D. C. RAMSEY, *President.*

CIVIL AERONAUTICS BOARD,
Washington, D. C., September 26, 1950.

MY DEAR MR. CHAPMAN: The Fuel and Oil Division of the Department of Interior has advised that a shortage in aviation fuel exists and will continue for an indefinite period. To alleviate this shortage they have proposed that the airline industry change commercial-fuel specifications to MIL-F-5572, which raises the lead content from 3 to 4.6 cubic centimeters per gallon and lowers the volatility of the fuel. These changes are in direct conflict with the fuel specifications which the airlines and engine manufacturers have endeavored for years to obtain to eliminate operational and maintenance difficulties due to fuel. Therefore, the commercial industry is vitally concerned about accepting this change without first ascertaining that every other feasible source, less critical to the results of such change, have been tapped.

Qualified representatives of the commercial airlines, engine manufacturers, and allied product manufacturers were assembled in Washington on September 20 to discuss the effects these changes in fuel will have upon the airline operating economy, maintenance, and safety. These representatives were informed concerning the details of the proposed fuel change by representatives of the Department of Interior. After careful review of the various factors affected by the proposed change, the representatives of the industry were of the unanimous opinion that such changes would have the following results:

1. Considerably increase the hourly or per mile fuel consumption and consequently reduce the available fuel stocks in direct proportion.

2. Seriously reduce the number of flying hours with the available commercial airplanes and consequently reduce the airlift capacity for national defense.

3. Reduce the excellent safe operating record for which the airlines have energetically striven during the past 25 years.

4. Greatly increase manpower required for adequate maintenance of engines and increase the requirements for spare engines and engine parts.

For a brief discussion of the reasoning behind the above conclusions, you are referred to the attached letters from the Air Transport Association to the Director, Fuel and Oil Division, Department of the Interior, and to the Deputy Administrator, Civil Aeronautics, dated September 21 and 22, 1950, respectively.

Hon. OSCAR L. CHAPMAN,
Secretary of the Interior,
Washington, D. C.

The adverse effects of increasing lead content and lowering fuel volatility are well known to the commercial industry and were experienced in earlier years, during which the present commercial fuel was being developed. This operating experience was further substantiated by controlled tests conducted in 1944. The Board is vitally concerned with the safety aspects that the proposed fuel-specification changes will involve. Maintenance difficulties will result in a decrease in hours of engine overhaul due to the increase in valve failures, valve-guide wear, cylinder and piston difficulties, and a great reduction in spark-plug life compared to present standards with the present commercial fuel. The added mechanical difficulties and reduced engine-overhaul period will necessitate more manpower to handle the additional maintenance, together with a higher inventory of spare parts.

The most critical item affecting safety, however, is the effect of this fuel on spark plugs. These effects are cumulative insofar as the spark plugs are concerned and will definitely result in an increase in in-flight engine failures. Most of these failures will occur during or immediately subsequent to take-off with high-power output, which is the most critical time as far as safety is concerned. Furthermore, the increased plug difficulties will create more hours of one cylinder out and rough operation, which will have a direct bearing on the present propeller and propeller-hub fatigue problem. We cannot afford to countenance any condition which will increase the propeller failure problem; rather, we must and are doing everything possible to decrease it.

The commercial aviation industry is reported to only use seven-tenths of 1 percent of the total civilian domestic petroleum demand. Yet it is proposed to penalize this industry and make up the fuel shortage by a change in specifications which, theoretically, will give approximately 10,000 more barrels of aviation fuel per day. Since the increase in fuel consumption as a result of this change will be approximately 7,000 barrels daily, the net gain is not proportional to the disadvantages and hazards involved.

Considering all factors involved, the Board is of the opinion that further study should be made in an effort to make up the deficiency by one or a combination of the following methods: A modification of existing catalytically cracking processes to obtain aviation gasoline stock instead of motor-fuel stock, and/or the lowering of the present octane rating of motor fuel from 90 percent octane premium, 80 regular, to 75 and 70, respectively. It appears that the use of one or a combination of either of the above methods would not require gas rationing to an appreciable degree, nor would it noticeably affect the supply of motor fuel to the public.

The above is premised on the understanding that if and when the above change in fuel specifications becomes truly necessary in the interests of national defense every cooperation will be given toward meeting these demands. The alternate will be accepted and operations controlled accordingly to provide a comparable safety standard.

Sincerely,

JOSH LEE,
Acting Chairman.

AIR TRANPORT ASSOCIATION OF AMERICA,
Washington, D. C., September 27, 1950.

Maj. J. R. PARTEN,
Department of the Interior,
Washington, D. C.

DEAR MAJOR PARTEN: In accordance with your request to the airline industry today, we outline below the effects to the commercial airlines of a change of fuel specifications from the present type to the military-type aviation gasoline.

SAFETY

Increase engine feathering in flight due to valve failures by approximately 300 percent;

Increase number of discontinued take-offs by about 100 percent;

Increase propeller-blade-fatigue failures due to one cylinder cut by approximately 100 percent;

Increase torquemeter and propeller-actuation mechanism malfunctioning by about 100 percent;

Increase excessive crankcase sludge deposits and bearing failures by about 50 percent; and

Increase substantially over-all possibilities of major and potentially fatal accidents.

MAINTENANCE

Reduce engine times between overhaul, depending on engine type, by 16 to 50 percent;

Increase spark-plug removals by 65 to 75 percent;

Increase premature engine removals by about 75 percent;

Increase inventories of engines and spare parts by 20 to 25 percent;

Increase maintenance shop facilities and tools by about 20 percent; and

Increase man-power requirements by approximately 20 percent.

FUEL CONSUMPTION

Increase airline-fuel consumption to assimilate higher lead and power volatility by about 15 percent and thus considerably nullify aviation-gas production increase expected from the specification change.

AIRLIFT

Seriously reduce commercial-airline airlift capacity for national defense.

ECONOMICS

Increase commercial-airline fuel bills by about 15 percent.

Increase maintenance costs by approximately 20 percent.

In view of the seriousness of implications of the proposed plan, we strongly urge that every possible avenue to reach the desired objective be explored.

Reference is made to letter from the undersigned on this subject, dated September 21, to Mr. H. R. Stewart, Director, Fuel and Oil Division, Department of the Interior, and also to the letter of September 22 from Admiral Ramsey, president of Aircraft Industries Association, to Mr. Stewart.

Sincerely yours,

MILTON W. ARNOLD,
Vice President, Operations and Engineering.

HEADQUARTERS, UNITED STATES AIR FORCE,
Washington, D. C., December 19, 1950.

Mr. H. A. STEWART,
Acting Deputy Administrator, Petroleum Administration for Defense, Washington, D. C.

DEAR MR. STEWART: Reference is made to your letter of October 5, 1950, on objections of commercial airlines to specification changes contemplated on high-octane aviation gasoline. An interim reply to your letter was forwarded on October 13, 1950.

The effect of volatility and lead content on operation and cost of commercial and passenger freight use, as outlined in the letter from the Air Transport Association of America is recognized. The Air Force has been aware of the added maintenance and flight difficulties encountered with high-lead-octane fuel; however, the policy of using high-lead-content fuel during peacetime operation was adopted in an effort to establish true tactical efficiency and ways and means of reducing or eliminating the ill effect of lead. Our experience has shown that a high-lead-content fuel is necessary for efficient operation of certain tactical aircraft, and that good performance can be expected in cargo aircraft. The B–36 on long-range, high-altitude, normal lean, operation is susceptible to high-

lead-content fuel to a slight degree, but under other flight conditions the adverse effect of lead is negligible.

It is difficult for the Air Force to compare the effects of low-lead-content aviation fuel with that of a high-lead-content aviation fuel on the basis of fuel consumption, since the Air Force has used only a military fuel which contains a high-lead-content. High safety standards are maintained through preventive maintenance procedures which are covered in Air Force Technical Order 01–1–436, copy of which is attached for your information. This safety record is best borne out by the experience of the Military Air Transport Service, which operates the largest cargo and passenger air fleet in the world, using a 4- to 4.6-millimeter lead-content fuel for all flights, including extensive overwater operations. They have established an enviable safety record. Commercial airlines operating under Government contract are supplied in most cases with military specification fuel generally containing a high lead content, apparently without impairing their safety.

As you are probably aware, engineering tests are being conducted on a lead scavenger which is added to the fuel to reduce lead build-up to a minimum.

Tests are also being conducted on fuel incorporating aromatic amines and a lower lead content in an effort to provide a high-performance fuel with a probable lower lead content. These tests have not progressed to the extent that a final indication of results can be established. From all present indications it will be necessary to continue utilizing a high-lead-content fuel to prevent severe shortages of high-performance product under emergency conditions.

Very truly yours,

W. E. FARTHING,
Major General, United States Air Force,
Director, Maintenance, Supply and Services,
Office, Deputy Chief of Staff (Matériel).

EXCERPT FROM STENOGRAPHIC TRANSCRIPT OF PROCEEDINGS BEFORE THE NATIONAL PETROLEUM COUNCIL OF SEPTEMBER 28, 1950

Mr. HALLANAN. Gentlemen, it has been talked about and discussed in the press, since the matter of the shortage of aviation gasoline has been projected, that consideration has been given to a change in the octane rating of civil and aviation gasoline.

We have been asked today by the Department to invite Mr. D. W. Rentzel to speak to the Council with regard to the viewpoint of the Civil Aeronautics Board. Mr. Rentzel is at this moment the Administrator of the Civil Aeronautics Administration, but has within recent days been named Chairman of the Civil Aeronautics Board.

He is here to talk to us about the matter of this octane problem, and I take pleasure in presenting to the Council, Mr. Rentzel.

STATEMENT OF DELOW WILSON RENTZEL, CHAIRMAN OF THE CIVIL AERONAUTICS BOARD

Mr. RENTZEL. Mr. Chairman and gentlemen, I am appreciative of your time. I will try to make this very brief. I would like to bring to the attention of the committee, however, the very serious nature of the aviation-gasoline shortage and particularly emphasize the alarm with which we view a suggested reduction in the octane rating and increase in the lead content of aviation gasoline, particularly as applied to commercial airlines, since it does not affect particularly the smaller types of aircraft.

We understand that there is a serious shortage in aviation gasoline and it has been brought about principally by the Korean situation. We understand that that situation is likely to continue. It was suggested, I believe at a previous meeting, that by increasing the lead content of aviation gasoline from 3 cubic centimeters to 4.6 a saving of approximately 10,000 barrels of gasoline a day—aviation gasoline—would result.

This, of course, in our opinion, does not take into consideration a reduction in the safety standards and increase in the maintenance problem on aircraft engines, a definite increase in the overhead as far as the operating costs are concerned, a number of increased engine failures, and a number of increased precautionary feathering of engines which would in our opinion result.

It would also mean a reduction in the number of hours between overhauls which we would allow airlines to operate their engines.

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We feel further that this would not be a complete saving. In our estimate of the situation, the net saving would not result in 10,000 barrels per day, since increased consumption, which we conservatively estimate to be 5 to 10 percent, would take up a substantial portion of that estimated saving.

We would like to call to the attention of the committee further that this situation is not going to be a temporary one, and to urge consideration of a further reactivation of alkylate plants and other facilities necessary to produce more aviation gasoline.

As the Air Force of the military forces increase their number of aircraft from the present 48 groups up to 90 or perhaps even 100 groups in the immediate years to come, this shortage of aviation gasoline will continue to be increasingly severe. Of course, the civil air operation will be further handicapped by that military requirement.

It is our understanding that approximately 50 percent of the alkylate plants which were operating at the close of World War II are now in operation. We understand further that approximately 18 months will be required in order to reactivate some of these plants.

We would strongly urge that consideration be given to a reactivation of a number of these plants in order to increase the aviation-gasoline capacity to higher-octane capacity, and if possible the 18 months' interval be reduced.

We further, without attempting to estimate where the increased aviation gasoline needs can be met, would certainly suggest at least the hope that other forms of fuel might be considered to meet this need.

I would like, in closing, Mr. Chairman, to point out that the aviation-gasoline requirements of the commercial airlines amount to only seven-tenths of 1 percent of the total petroleum consumption. We feel that the importance of civil aviation and the safety factor involved interests all of you. Certainly we would hope that we would not have to take a reduction in safety standards.

We would hope further that the airlift possibility that we may be called upon to meet, even though Korea may be closing out, may break out in other parts of the world, and the situation I would again like to mention is the fact that increased consumption is going to be the order of the day for the next several years in any event for both military and civil.

We hope the committee will give our problem serious consideration. Thank you.

Mr. HALLANAN. Thank you, Mr. Rentzel.

Gentlemen, are there any questions?

Mr. BRUCE K. BROWN. Do you think it would be preferable to ration civilian aviation gasoline in this crisis downward, and have less of it in the next few months, rather than increase the lead content? We can do it that way.

Can you get along with less?

Mr. RENTZEL. If we have to ration them, I would again like to exclude private aviation, since they are not involved; they use standard-brand automobile gasoline. I think the question is whether you should decrease the amount of automobile gasoline or ration the number of aircraft-airline types of operations. Is that the question?

Mr. BRUCE K. BROWN. No; it is not that question. We can't put motor gasoline in an airline aircraft. That is what you just said. I am wondering if you can get along with less gas until we can get this thing organized.

Mr. RENTZEL. Of course, if we have to.

Mr. BRUCE K. BROWN. Wouldn't that be preferable on a temporary basis to use less gasoline in the civil airlines and keep it at 3 cubic centimeters, or would you rather run on 4.6 for a couple of months until we get organized?

Mr. RENTZEL. You are asking only a temporary answer to the problem?

Mr. BRUCE K. BROWN. Yes. You brought it up, and I am asking a question on it.

Mr. RENTZEL. If it came down to a question—certainly I would decide on the side of safety any time. My answer to it is that I would prefer to see a reduction in the amount of gasoline rather than a reduction in the amount of safety any day. That is my job.

Mr. ALTON JONES. Realizing the position taken by the airlines in Civil Aeronautics controls, the economies involved in air transportation will be greatly complicated by their increase to 4.6 cubic centimeters. Certainly your maintenance costs and everything else will go up, and the precautions that you have to take.

But do you really feel that the question of safety is a vital one here? As I understand it, the armed services are using 4.6 in all of their aviation gas, or sub-

stantially all of it. I know your first concern is one of safety. But do you think that is the primary factor involved here, or is it economy?

Mr. RENTZEL. No, sir; I think it is safety. I think the military will agree that they are accepting a reduction in the number of safe hours of operation of aircraft engines and that the maintenance costs will go up.

I again would like to point out that consumption will go up. I don't believe they deny that. I do think that they are in a position, of course, which we fully realize, that they must meet the existing emergency in Korea and as to gasoline they are going to do anything necessary to get it.

My point is simply that at least on behalf of the civil aviation part of the Government we are not prepared to take that reduction if we can avoid it. I am not saying that we won't take it. I certainly don't mean to say that. I say simply that if there are any other means available of making aviation gasoline under the present specifications available, we would certainly urge that it be considered.

I would say that if we have to take this lead content increase that we will issue the necessary instructions to reduce the number of hours between overhauls immediately, and to increase the maintenance.

Mr. ALTON JONES. I think, as Mr. Brown pointed out, the question facing the petroleum industry at this time is one of timing. Time is of the essence. We are faced with an acute shortage now. I think the suggestion that the airlines use 4.6 cubic centimeters of lead is born of the fact that it is one that can be quickly effectuated.

The suggestions you make of building additional outlet plants we agree is sound, but it takes months, as you know, to do it.

I think Mr. Brown meant to emphasize the fact that if we had to do something immediately to get the services over the hump, that this 4.6 cubic centimeters might be a temporary expedient. There is a problem that is going to have to be resolved in some organization here.

Mr. RENTZEL. I fully realize that. I don't want to leave you with the impression that we are not going to be cooperative. We are just as interested in seeing the war in Korea successfully prosecuted as anybody else.

I was pointing out our problem from the safety point of view and to ask that the committee give every consideration to increasing the supply of aviation gasoline.

This is not a temporary situation. It is one that is going to be increasingly difficult. We would hope that some means could be found. I would certainly hope that if the choice came between automobile fuel and aviation gasoline, we would decide on the side of aviation gasoline. That would naturally be my prejudice.

In view of the small percentage of petroleum products which aviation gasoline represents, we would think that that consideration might be given. That is really the purpose of my trip here today.

Mr. HALLANAN. Mr. Parten.

Mr. PARTEN. Mr. Rentzel, I would like to ask a question. I would first like to comment on your question, Pete.

I have a mimeographed copy of a letter in my hand which I have received from Gen. Milton Arnold, of the American Airlines Association. General Arnold would answer your question yes, if we have to cut commercial aviation gasoline 15 percent, rather than put in more lead, let us cut it.

He has already answered it for me. This question is serious because it involves safety. It is not the dollars and cents involved. We may have to do a lot of things and waste dollars and cents in order to get the job done. The safety angle is important.

The manpower question is important when it comes to the question of how much more manpower you are going to have to have to service these engines.

The commercial aviation is doing yeoman work today not only for civilians but for the military, as we all know.

If you will permit me, I would like to ask the Secretary to read this letter which General Arnold has written. You might like to ask a question on it. I think this has been circulated.

Mr. FENTRESS. I would like to ask a question. I am not sure that Mr. Rentzel understands, first, that a substantial volume of aviation gasoline is being supplied and has been supplied for a considerable time to the commercial airlines at 4 cubic centimeters of lead and not 3. They have been operating on that and apparently operating quite successfully.

Secondly, I would like to offer to Mr. Rentzel the services of our office because time will not permit this afternoon to go into the intricacies of refining opera-

tions on these alternate proposals which the airlines have suggested as means of making aviation gasoline.

I would be only too happy to go over with any member of your staff the reasons why this is practical.

Mr. RENTZEL. I would be delighted to do so.

Mr. HALLANAN. Dr. Wilson?

Mr. WILSON. It seems to me that there is a certain amount of confusion about this. You spoke of a reduction in octane and increase in lead content. As I understand it, there is no reduction in octane proposed. This letter speaks of reduction in volatility also. As I understand, there is no reduction in volatility proposed either.

Mr. RENTZEL. Yes, sir, there is.

VOICE. To the military specifications.

Mr. WILSON. I don't know about a lot of these statements, as to frequency of overhaul, but I heard very much this same story at the beginning of World War II when we asked the military to go from 4 to 3.6. They visualized all kinds of things. They had a list that might have been written by the same fellow who wrote this as to what it would do to them.

When they got to using it they didn't have very much more trouble. True, they may have to clean the engines more frequently, but nowhere near the stories we heard. To say this would increase fuel consumption by 15 percent is, to my mind, ridiculous.

Mr. RENTZEL. I didn't say that.

Mr. WILSON. No; but this letter does. And it gives a lot of other figures. This has been very extensively used and even the commercial airlines, as Mr. Fentress said, have been using 4 cubic centimeters in many cases, and private airplanes.

I think this definitely gives an exaggerated opinion of the troubles.

Mr. RENTZEL. I want to make one thing clear. I did not associate myself with the letter from the airlines. I am talking about my own people who I think are reasonable on aircraft-engine operation, and what they say.

I think some of their claims are perhaps high, too, particularly as to gasoline consumption. It will be increased, and I think the military agree to that. I do think the maintenance will definitely be increased and I think the percentage of failures will definitely increase.

I would like to make it once again clear that if that is the only way we can meet the current situation, certainly we will go along with it. But I would hope that something could be done that would make a long-term solution to the problem which is going to get increasingly worse, possibly.

I think that was the main reason I wanted to bring it to the attention of this committee. I further believe that while I am not arguing the point that they have not used 4.6, or 4.0—I don't know which you meant——

Mr. WILSON. 4.4.

Mr. RENTZEL. You are talking of 4.6 here as I understand it. I don't wish to debate that point. I simply say that if the situation can only be met in that fashion, we will have to take certain precautionary steps because that is our job. We will do so, and I am hoping that something more of a permanent nature can be resolved in the committee here as part of the over-all emergency situation we are faced with today.

Mr. HALLANAN. Mr. Brown will read the letter. Then if you care to make any further comment, Mr. Rentzel, you may do so. It is on the same subject.

Mr. JAMES V. BROWN. This is a letter signed by Milton W. Arnold, Vice President of Operations and Engineering, from the office of the Air Transport Association of America, dated September 27, 1950, addressed to Major J. R. Parten.[1]

Mr. HALLANAN. Do you have any further comment, Mr. Rentzel?

Mr. RENTZEL. Mr. Chairman, my only comment is that I don't fully agree with all the statistics employed. I want to make it again clear to the committee that I did not come here subscribing to all those details. I think generally the facts are simply that there will be some increased fuel consumption, there will be additional economic losses. There is no question of that. That is not what concerns me.

What concerns me more are the safety aspects itself which I will still maintain is a problem that we are concerned with, and I would like to again simply urge the committee to make this solution, whatever we have to come up with, as

[1] See Item No. 4 under Exhibit C.

temporary as possible, and get a long-range plan that will take care of our requirements.

One thing again I would like to say: in regard to the operations of civil air, both in the present emergency and in the time of all-out war are going to be increased rather than decreased. I think all of us will agree to that. Our airlift possibilities are rather important to the military, too.

I believe that is all that I have.

Mr. HALLANAN. We appreciate your coming, Mr. Rentzel, very much.

OCTOBER 18, 1950.

DR. ADDISON M. ROTHROCK,
Assistant Director for Research,
National Advisory Committee for Aeronautics,
Washington, D. C.

DEAR DR. ROTHROCK: When during August the military was faced with a marked deficiency in supplies of high-octane number aviation fuels over the balance of this year, the Military Petroleum Advisory Board recommended to the Oil and Gas Division of the Department of the Interior that commercial aviation fuel specifications be revised to bring them in line with military specifications. We are aware that the significant changes would involve increased tetraethyl lead content and a slightly higher distillation range. It was conservatively estimated that this revision would provide 10,000 barrels per day of additional grade 100/130, and had it been placed in effect at the time it was recommended about 40 percent of the shortage would have been eliminated.

The Air Transport Association and the Aircraft Industries Association were formally notified of this proposal, and a joint meeting of the two groups was held in Washington on September 20. The opinions and conclusions arrived at in this meeting are summarized in the attached letter, dated September 21, addressed to the Director of Oil and Gas Division by Gen. Milton W. Arnold, vice president, operations and engineering, Air Transport Association of America. Two additional letters bearing upon this subject are also attached: one from Admiral D. C. Ramsey, president, Aircraft Industries Association of America, Inc., addressed to the Director of the Oil and Gas Division; the other, a second letter from General Arnold, addressed to Maj. J. R. Parten, a consultant to the Secretary of the Interior.

The numerous objections raised in the attached correspondence to the specification change were not anticipated when the proposal was made. It was conceded that some increased maintenance problems might be induced by higher lead content fuels. Further, it was felt that if the need for any increased maintenance was recognized and acted upon the effects of the specification change would not be significant with reference to safety. These opinions would appear to have some basis in fact. Although it is probable that a major portion of the high-octane number aviation gasoline used by commercial consumers contains about 3.0 milliliters of tetraethyl lead per gallon, a considerable quantity does contain nearer 4.0 milliliters per gallon. On the west coast nearly all production is at the higher lead level. At east two major suppliers in the Midwest and East use between 3.5 and 4.0 milliliter per gallon in fuels that they supply commercial consumers. These facts and the experience of airlines operating on fuels containing 4.6 milliliters of tetraethyl lead per gallon during the last war would indicate that many of the adverse effects may have been overemphasized.

We have asked the Air Force and the Bureau of Aeronautics to comment on the objections that have been raised. The experience that these groups have had in the operation of aircraft equipment similar to that used by commercial airlines, and under comparable conditions, should place them in a good position to evaluate the effects of such a specification change.

We believe, however, that this matter should also be brought to your attention. In your research and development activities you have undoubtedly made extensive studies of the effect of fuel variables upon engine and accessory performance. Since volatility and lead content constitute two of the more important fuel variables, you must have data available to you which would constitute a measure of the effect of the proposed specification change upon maintenance, safety, and fuel consumption. The members of your committees and subcommittees should also be in a position to comment. If you should establish from your experience and from the experience of your committee members that the effects are as extensive as indicated by the commercial users, it seems that serious consideration should be given to undertake immediately a development program

toward eliminating such extensive difficulties. This statement is made on the premise that should this country be forced into an all-out war, all aviation gasoline would be produced to military specifications. Based upon the data in General Arnold's letter, such a change would have an extensive effect on airline operations when it could least be afforded.

We realize that consideration of this problem will require considerable time on the part of your own organization and your advisory committees and that for this reason an immediate answer will not be forthcoming. We shall, however, appreciate receiving your comments at some future date.

Sincerely yours,

H. A. STEWART, *Acting Deputy Administrator.*

EXHIBIT D

Item No. 1.—Excerpt from minutes of meeting of Subcommittee on Aircraft Fuels, Committee on Power Plants for Aircraft of the National Advisory Committee for Aeronautics, dated July 26, 1951, and containing two resolutions relating to effect of military avgas in commercial airline operation.

Item No. 2.—Letter from R. T. Hurley, president of the Curtiss-Wright Corp., to Mr. S. D. Heron, dated August 14, 1951, giving results of tests using 4.6 cubic centimeters TEL fuel in their engines.

Item No. 3.—Letter of October 5, 1951, from W. C. Mentzer, general manager (engineering), United Air Lines, to Mr. Bruce K. Brown, Deputy Administrator, Petroleum Administration for Defense, opposing the possible issuance of PAD Order No. 4.

Item No. 4.—Letter of October 29, 1951, addressed to Donald W. Nyrop, Chairman, Civil Aeronautics Board, by Secretary of the Interior Chapman in reply to Mr. Nyrop's letter of October 5, 1951, on the effect of PAD Order No. 4 on civilian airlines.

Item No. 5.—Letter of November 19, 1951, addressed by Secretary of the Interior Chapman to Mr. Milton W. Arnold, vice president (operations and engineering), Air Transport Association of America, in reply to Mr. Arnold's letter of November 5, 1951, on the subject of the effect on commercial airline operations of PAD Order No. 4.

EXCERPT FROM MINUTES OF MEETING OF SUBCOMMITTEE ON AIRCRAFT FUELS, COMMITTEE ON POWER PLANTS FOR AIRCRAFT, JULY 26, 1951

Resolved, That it is the opinion of the NACA Subcommittee on Aircraft Fuels that no acute difficulties are to be anticipated by the complete use of military avgas by the commercial airlines; and

Resolved, That it is the further opinion of the NACA Subcommittee on Aircraft Fuels that the data which have been made available on the effect of military avgas in airline operation are inconclusive and the effect could only be determined by a complete study of the data by a suitable group. This subcommittee is not in a position to judge whether such a study would be justified.

CURTISS-WRIGHT CORP.,
OFFICE OF THE PRESIDENT,
Woodridge, N. J., August 14, 1951.

Mr. S. D. HERON,
The Whittier, Detroit, Mich.

DEAR SAM: I have checked with our engineers and they agree that our engines have been designed and developed to operate on 4.6 cubic centimeters of lead and we have no reason to be concerned as to the use of this lead content on the airlines.

I can find no information or records that would indicate what this would do to airlines' maintenance practices or slugding of engines. Ethyl, no doubt, would be more likely to have this.

Our engines, using fuel injections, of course, have good fuel distribution and we are not subject to spark plug fouling from lead.

Very truly yours,

CURTISS-WRIGHT CORP.,
R. T. HURLEY.

UNITED AIR LINES,
MAINTENANCE BASE,
South San Francisco, Calif., October 5, 1951.

Subject: Aviation fuel specifications.

BRUCE K. BROWN,
Deputy Administrator, Petroleum Administration for Defense,
Interior Building, Washington, D. C.

DEAR SIR: It is our understanding that your agency has advised Pan American World Airways that it is about to require that fuel manufactured according to current military specifications be supplied to commercial operators on international routes; and further that it is expected this dictum will later be applied to aviation gasoline supplied to commercial operators on domestic routes.

The purpose of this letter is to advise you that we are strongly opposed to any such action. We have already submitted data to the ATA and NACA showing that the added tetraethyl-lead content and the wider volatility range allowed by the military specification will reduce the safety and utilization of our aircraft for the following reasons:

(*a*) Reduced overhaul periods.

(*b*) Disruptions in engine operation due to ignition malfunctioning.

(*c*) Inability to meet CAA required minimum take-off powers of installed engines, resulting in off loading of aircraft.

(*d*) Increased engine failures. (Approximately one-third of all engine failures are the result of combustion chamber difficulties. Others are due to lubrication failure due to oil passage stoppage by TEL deposits.)

(*e*) Increased fuel consumption by at least 6 percent.

In view of the present policies of the Petroleum Administration with respect to automotive gasoline and the controversial nature of the laboratory tests which provide the basis for the figures presented by the petroleum industry, we consider our stand to be a just and patriotic one.

Very truly yours,

UNITED AIR LINES, INC.,
W. C. MENTZER,
General Manager, Engineering.

DEPARTMENT OF THE INTERIOR,
OFFICE OF THE SECRETARY,
Washington 25, D. C., October 29, 1951.

DEAR MR. NYROP: In your letter of October 25 you comment on the effects on the civilian airlines of PAD Order No. 4 which establishes minimum lead-tetarethyl content in civilian aviation gasoline, and you ask that the order be stayed pending further review and discussion. The order was issued October 19 and is to become effective on October 30, 1951.

On October 23 representatives of the Civil Aeronautics Board, Civil Aeronautics Administration, the airlines, and the engine manufacturers met with members of my staff and me for a discussion of the order. On October 25 a similar group representing the same agencies and companies met with the technical staff of PAD for further discussion. In both of these meetings it was pointed out that the supply of aviation gasoline in this country for military, civilian, and exports demands was in a very critical situation and that in fact we are faced with a continuing deficit in the supply of this product.

The Petroleum Administration has taken every known step to increase the production of aviation gasoline, including the issuance of PAD Order No. 3, issued on October 19, to the refining industry, requiring them to maximize avgas production. Even with the issuance of these two orders, PAD's estimates indicate that there will be a continuing shortage of aviation gasoline. I need scarcely point out to you that a shortage of aviation gasoline has serious implications regarding the national security and the economic well-being of this country and of friendly foreign nations. Because of these factors and because we are certain that PAD Order No. 4 will result in an increased net availability of aviation gasoline, it is not advisable to consider a stay in the effective date of PAD Order No. 4.

You may have my assurance that whenever in the future the supply situation in regard to avgas improves, the order affecting the quality of civilian avgas will be rescinded.

Sincerely yours,

OSCAR L. CHAPMAN,
Secretary of the Interior and Petroleum Administrator for Defense.

CIVIL AERONAUTICS BOARD,
Washington, October 25, 1951.

Hon. OSCAR L. CHAPMAN,
Secretary of the Interior, Washington, D. C.

DEAR MR. CHAPMAN: The Petroleum Administration for Defense has advised that a shortage of aviation fuel again exists and will continue for an indefinite period due to an increase in military requirements. To alleviate this shortage an order has been issued changing the commercial aviation fuel specification by increasing the tetraethyl-lead content from 3 cubic centimeters to 4 cubic centimeters per gallon for domestic operation and to 4.6 cubic centimeters per gallon for export, maintaining in effect the present volatility of the commercial aviation fuel with 3 cubic centimeters lead content. Also, the other exempts the Boeing 377 operation because of fuel requirements for the power plant involved where the operator submits a request for such an exemption. These changes are in direct conflict with the fuel specifications which the airlines and engine manufacturers have endeavored for years to obtain and maintain to eliminate operational and maintenance difficulties due to fuel. Therefore, the commercial carriers and the engine manufacturers are vitally concerned about accepting this change without first ascertaining that every other feasible source, less critical to the results of such change, has been tapped.

Recent discussions with representatives of the Petroleum Administration for Defense, Civil Aeronautics Administration, and Civil Aeronautics Board disclosed the need for a meeting between representatives of the Petroleum Administration for Defense, the commercial airlines, engine manufacturers, Civil Aeronautics Administration, and Civil Aeronautics Board to elicit pertinent information on certain questions raised by both the industry and Petroleum Administration for Defense relating to the proposed order.

Such a meeting was convened by you on October 23, 1951; however, the main issues presented by the representatives present of the commercial transport industry were not resolved. By mutual agreement, the subject matter is to be further discussed in a meeting scheduled for October 25, 1951, to review and discuss the technological data upon which the subject order is based.

Confirming the remarks of Mr. Adams, Board member, to you on October 23, 1951, it is urgently requested that the order be stayed until the review and discussion on the subject matter has been completed. This delay appears most urgent in the interest of a better understanding of mutual problems and related factors involved.

The above is, of course, premised on the understanding that if and when a change in fuel specification becomes truly necessary in the interests of the national emergency, every cooperation will be given toward meeting these demands. The alternate will be accepted and operations controlled accordingly to provide a comparable safety standard.

Sincerely yours,

DONALD W. NYROP, *Chairman.*

DEPARTMENT OF THE INTERIOR,
OFFICE OF THE SECRETARY,
Washington 25, D. C., November 19, 1951.

Mr. MILTON W. ARNOLD,
Vice President, Operations and Engineering,
Air Transport Association of America, Washington, D. C.

DEAR MR. ARNOLD: This will acknowledge your letter of November 5 on the subject of PAD Order No. 4, which increases the lead content of aviation gasoline used by the commercial airlines. The letter contains an accurate résumé of the meetings between PAD, CAA, CAB, and ATA.

You may rest assured that PAD Order No. 4 will be rescinded as soon as aviation gasoline supplies are adequate to meet both military and commercial demands.

Sincerely yours,

OSCAR L. CHAPMAN,
Secretary of the Interior and Petroleum Administrator for Defense.

AIR TRANSPORT ASSOCIATION OF AMERICA,
Washington 6, D. C., November 5, 1951.

Hon. OSCAR L. CHAPMAN,
Secretary of the Interior,
Interior Building, Washington 25, D. C.

DEAR MR. SECRETARY: This refers to Petroleum Administration for Defense Order No. 4 which requires an increase in lead content of aviation gasoline from 3 to 4 cubic centimeters per gallon of civilian domestic aviation gasoline and from 4 to 4.6 cubic centimeters per gallon for civilian aviation gasoline for export. You will recall that a meeting was held on October 23 in the Interior Building between Government and industry personnel in an attempt on the part of the airlines to convince the PAD that this order should be revoked.

Some time previous to the issuance of the above order, the ATA advised the CAA and CAB that such an order was being considered and that the airlines were opposed to an increase in lead content of present gasoline, since the effect on safety, utilization, and economics of airline operation would be severe. The CAA and CAB, as the claimant agencies for the airlines, entered into discussions with the PAD in an effort to forestall any action until the airlines were given an opportunity to present their case. However, before the discussions were completed, the PAD issued the order on the basis of urgency. At no time was the ATA officially informed by the PAD of this proposed action. On October 19, the day PAD Order No. 4 was issued, the ATA requested the above referred to October 23 meeting. As a result of the discussions during this meeting, it appeared that there was a difference of opinion between Government and industry people as to the net increase in production which would result from PAD Order No. 4. This difference of opinion stemmed from the contention of the airlines that the increase in fuel consumption would nearly cancel the gain in production contemplated by the PAD. The PAD presented figures showing that an increase from 3 to 4 cubic centimeters on domestic gasoline would result in a 12 percent increase in production and on the export portion raised from 4 to 4.6 the result would be a 6 percent increase in production. The airline representatives explained that the increase in fuel consumption resulting from the high lead would be on the order of 5 to 8 percent. In order to settle this point and to exchange views on specific detailed figures, a small meeting was held on Thursday, October 25, between Messrs. T. L. Apjohn, C. E. Davis, W. C. Huffman, and D. L. Neal of the PAD; and Messrs. Jos. Adams and E. N. Townsend of the CAB; Mr. S. H. Rolle of the CAA; and Messrs. W. C. Lawrence, J. Hendren, M. Fisher, A. W. Dallas, and E. A. Droegemueller of the airlines and manufacturers.

During this second meeting the airlines pointed out the cumulative effect on fuel consumption resulting from (*a*) increased plug fouling, (*b*) necessary mixture enrichment, (*c*) opening of cowl flaps, (*d*) more abortive flights, (*e*) more frequent use of emergency rich mixture when engines malfunction, and (*f*) more frequent single- and three-engine operation. As a result of airline operating experience with lead fouling, it was conservatively estimated that the cumulative effect would amount to approximately 5 to 8 percent increase in fuel consumption on that portion of the present fuel which would be increased in lead content. This estimate could not be proven absolutely due to the lack of control by the airlines over the fuel of different lead content which is used in airline equipment. In other words, it is rare for particular airplanes to be operated exclusively on either 3 or 4 cubic centimeter due to the nature of the routing of aircraft over airline systems, and, accordingly, definite comparisons between engines could not be made. However, the airlines are very sincere in their belief that increased fuel consumption of the above order will result. It was obvious from the discussions that the PAD representatives did not agree with the 5 to 8 percent airline estimate, and were of the opinion that a lower figure would actually be the case

The PAD provided statistics, as shown below, with respect to the amount of increased production anticipated by PAD Order No. 4. From PAD's check of

refineries it was stated that the present situation with respect to the manufacture of 100/130 grade commercial aviation gasoline is as follows:

Lead content	Usage	Barrels per day
3.0 cubic centimeters	Domestic	19,170
4.0 cubic centimeters	do	20,020
4.6 cubic centimeters	do	520
3.0 cubic centimeters	Foreign	1,040
4.0 cubic centimeters	do	17,010
4.6 cubic centimeters	do	15,620

From the above it may be noted that an increase in production due to lead content increase could only be realized on the domestic and foreign 3 cubic centimeter and the foreign 4 cubic centimeter. At this point the PAD officials introduced higher percentages for increased production than those given during the general meeting on October 23. (These were 12 percent from 3 to 4 cubic centimeter and 6 percent from 4 to 4.6 cubic centimeter. These new percentages were given as 16.5 percent from 3 to 4 cubic centimeter and 8.4 percent from 4 to 4.6 cubic centimeter. It was explained that these higher percentages resulted from a more complete study by PAD in which they weighted the average alkylate quality of base stocks as of August 1951. In other words, the original lower figures were claimed to be conservative estimates. From these percentages and the above figures, the total increase in production resulting from PAD Order No. 4 was stated to be as follows:

			Barrels per day
16.5 percent	times	19,170 equals	3,163
24.9 percent[1]	times	1,040 equals	259
8.4 percent	times	17,010 equals	1,429
Total		37,220	4,851

[1] This percentage is higher since it applies to raising lead from 3 to 4.6.

NOTE.—In addition to the above, the PAD stated that 700 additional barrels per day will be available from a special case of one refinery which now produces 3 cubic centimeter gasoline. The grand total would then be 5,551 barrels per day.

The above adds up to 37,220 barrels per day of 100/130 gasoline now being produced by refineries for all commercial use which will be affected by PAD Order No. 4. If we apply the airline figure of 5 percent to 8 percent as being the proper increased consumption to this total figure we find that the estimated increased production will be reduced by increased consumption by about 1,800 to 3,000 barrels per day. Assuming the latter figure, the net increase in production would be 2,551 barrels per day. It is the PAD's contention that even this amount of 2,551 barrels per day is extremely important under present conditions and that the decrease in safety and other airline complications are not of sufficient importance to offset it.

From the above discussion, it appears to us that the PAD has no intention of holding up or revoking PAD Order No. 4. However, PAD officials did go along with the idea that the present order may be considered a temporary measure and promised that if the situation eased, they would give consideration to reducing the lead content in the future. Accordingly, the airlines will attempt to set up a program whereby the effects of PAD Order No. 4 may be quantitatively evaluated during the next few months of operation. These results, when available, will be brought to the attention of the Petroleum Administration for Defense.

Whether these "quantitative effects" will include the death of one person or of several hundred cannot be predicted, as experience in this matter is lacking. We do know the detrimental effect of this change in gasoline content upon the life of engines and their reliability, and the possibility of endangering human life through the action encompassed by PAD Order No. 4 is of great concern to all in aviation—the Civil Aeronautics Board and the Civil Aeronautics Administration, as well as to the operators.

Sincerely yours,

MILTON W. ARNOLD,
Vice President, Operations and Engineering.

EXHIBIT E

Item No. 1.—Letter of November 6, 1951, addressed by Secretary of the Interior Chapman to J. Carroll Cone, assistant vice president, Pan American World Airways, Inc., in reply to Mr. Cone's letter of October 25, 1951, regarding the effect of PAD Order No. 4 on Pan American's operations.

Item No. 2.—Letter of November 7, 1951, from J. Carroll Cone to Secretary Chapman further requesting modification of PAD Order No. 4.

Item No. 3.—Letter of November 29, 1951, from Bruce K. Brown, Deputy Administrator, Petroleum Administration for Defense, replying to Mr. Cone's letter of November 7, 1951, addressed to Secretary Chapman, refusing to accede to the request to modify PAD Order No. 4.

NOVEMBER 6, 1951.

Mr. J. CARROLL CONE,
Assistant Vice President,
Pan American World Airways, Inc.,
Washington, D. C.

MY DEAR MR. CONE: This will acknowledge your letter of October 25, 1951, expressing your views on PAD Order No. 4 and its effect upon the operations of Pan American World Airways, Inc.

We have discussed this matter with technical representatives of the airlines, including one from your company, and endeavored to explain in full the justification for the issuance of this order. Faced with the present shortage of high-octane-number aviation gasoline, we see no alternative to PAD Order No. 4 other than rationing aviation fuel to the airlines. With all of the ramifications involved in such a rationing program, we believe increased tetraethyl-lead content to be a more acceptable procedure, and we hope that with this, and other measures for increasing production, to avoid reducing the quantity of finished fuel that can be made available to commercial-airline operators.

Please be assured that the Petroleum Administration for Defense recognizes the fact that your airline will be faced with additional maintenance and operating problems. However, we do feel that you recognize this fact and will take steps to increase maintenance to avoid additional safety hazards.

I assure you that it is the intention of the Petroleum Administration for Defense to rescind this order as soon as supplies of aviation gasoline are adequate to meet both commercial and military requirements.

Sincerely yours,

OSCAR L. CHAPMAN,
Secretary of the Interior and Petroleum Administrator.

PAN AMERICAN WORLD AIRWAYS SYSTEM,
Washington, D. C., October 25, 1951.

Hon. OSCAR L. CHAPMAN,
Secretary of the Interior, Washington, D. C.

DEAR MR. SECRETARY: With reference to discussions of October 23–25 in your Department (PAD) on the subject of PAD Order No. 4, Aviation Gasoline Specifications, it is felt that it is in order to call your attention to the fact that Pan American World Airways, Inc., has carefully analyzed and reanalyzed the above order as it would affect international air transportation, and it is our carefully considered opinion that—

(1) An increase in lead content of grade 100/130 fuel from 4 cubic centimeters to 4.6 cubic centimeters would seriously affect the reliability and safety of long-range oversea operations and would create a serious bottleneck in motor overhaul and general maintenance, to the extent that the total airlift now being accomplished would be materially decreased.

(2) Due to the necessary enrichment of the carburetors to produce the required power, the increased consumption would equal, if not exceed, any increased production of the gallonage of gasoline that would be obtained by increasing the lead content from 4 cubic centimeters to 4.6 cubic centimeters.

(3) Because of the recognized current emergency, airline operators possibly to some extent may have reconciled themselves to the increase from 3 cubic centimeters to 4 cubic centimeters in a major portion of the fuel consumed by airline operations; but, according to a thorough investigation conducted by our technicians and chemists, there is no actual justification for further increase to 4.6 cubic centimeters.

It was stated by someone at the conference with PAD officials on October 23 that Pan American World Airways was buying 4.6 cubic centimeters gasoline at various foreign ports. I have checked this statement with our New York office and find that the statement is erroneous. We have not purchased 4.6 cubic centimeters gasoline from any of our suppliers anywhere in the world, and the only cases in which we have put 4.6 cubic centimeters gasoline into our tanks was at a few foreign points where we were forced to land and refuel at military bases. In each of these instances, we had partially full tanks of the lower-lead-content gasoline which diluted the 4.6 cubic centimeters gasoline to a lead content much lower than 4.6 cubic centimeters. In addition to the 4.6 cubic centimeters being immediately diluted to a lower lead content by the gasoline already in the tanks, it is also true that at the very next stop 4 cubic centimeters or even 3 cubic centimeters was used to refuel the tanks, further diluting the lead content of the gasoline we may have been compelled to take on at the military airport.

In view of all of the above, we earnestly request that PAD Order No. 4 be modified, at least to the extent that no higher lead content be required for overocean or international operations than may be required for domestic operations. In this connection, your attention is called to the fact that over-ocean operations do not have the multiplicity of emergency landing fields, radio range, airway lighting, et cetera, that is available for domestic operations; and, therefore, to that extent, oversea operations must be doubly safeguarded in order to provide equally safe operations with the domestic picture.

Please be assured that we are very desirous of cooperating to the fullest extent in all efforts of every department of our Government looking toward the enhancement of our security, and we feel that we would not be discharging our full responsibility to our country and the public welfare if we did not endeavor to emphasize our definite conclusions with reference to the above.

Very truly yours,

PAN AMERICAN WORLD AIRWAYS, INC.,
J. CARROLL CONE,
Assistant Vice President.

PAN AMERICAN WORLD AIRWAYS SYSTEM,
Washington, D. C., November 7, 1951.

MY DEAR MR. SECRETARY: I wish to thank you for your letter of November 6 in reply to my letter of October 25 relative to the airline-fuel situation.

I want you to know that I appreciate the fact that it is physically impossible, with the heavy load of other important matters resting upon your shoulders, for you to personally investigate and handle every question taken up with the various divisions of the Department of the Interior; but, since the lead content of the fuel used in the oversea operations of the airlines is such a serious question, we would appreciate it very much if further consideration could be given to the request contained in the next to the last paragraph of my letter of October 25.

Mr. Secretary, please believe me when I say that it is a fact that the oversea airways contain many more hazards than the domestic airways. This is due to the fact that all along domestic routes the Federal Government or the cities have provided a multiplicity of emergency landing fields, complete radio-range facilities, airway lighting, up-to-the-minute weather reporting, et cetera, and that along oversea airways there are no such facilities with the exception of comparatively limited weather reports; there are no emergency landing fields on the ocean, and very few comparatively overland in foreign territory. Further, the service and maintenance facilities in foreign territory are nothing to compare with those in our domestic field.

In view of all the above, there are greater hazards in overocean operation than there is domestic operation.

These things being true, we should like to emphasize that increased lead content in aviation gasoline, particularly for long-range operation, adds not only to maintenance problems, but to safety for other reasons.

We believe we are justly entitled, in view of all of the conditions surrounding this whole question, to ask again that PAD Order No. 4 be modified to the extent that oversea operations will not be required to use gasoline with a 4.6 cubic centimeters lead content when the requirements for domestic operations is 4 cubic centimeters, a safer fuel.

We note in the third paragraph of your letter you stated "However, we do feel that you recognize this fact and will take steps to increase maintenance to

avoid additional safety hazards." You may rest assured that we do always take every step possible to maintain the highest possible degree of safety; but in this instance just an increase of maintenance does not solve the problem.

Hon. OSCAR CHAPMAN,
Secretary of the Interior, Washington, D. C.

We, as is true with the military, have already reached a serious bottleneck with reference to competent maintenance personnel and motor overhaul facilities. We are struggling day and night with this problem. Nevertheless, the situation is bound to grow worse instead of better when we use 4.6 cubic-centimeter lead content in our fuel.

We cannot understand why the most hazardous routes—namely, the oversea routes—are required to use the most hazardous lead-content fuel and why we cannot at least be placed on a 4 cubic-centimeter lead-content basis along with the domestic airlines.

In conclusion, may I repeat what we said in the third paragraph of my letter: That thorough investigation and analysis conducted by competent airline technicians and operations officials has convinced us that there will be no actual saving in aviation gasoline by increasing the lead content on international operations to 0.6 cubic centimeter above the requirement for domestic operations; and we therefore pray that you will grant the modification we have so earnestly recommended.

Very respectfully,

J. CARROLL CONE.

NOVEMBER 29, 1951.

Mr. J. CARROLL CONE,
Assistant Vice President,
Pan American World Airways, Inc.,
Washington, D. C.

DEAR MR. CONE: In the absence of the Secretary of the Interior, your letter of November 7 has been referred to this office for reply.

The Petroleum Administration for Defense does not feel that it is in a position to accede to your request that it modify PAD Order No. 4 to reduce the minimum lead content of gasoline being shipped abroad from 4.6 milliliters [cubic centimeters] per gallon to 4 milliliters per gallon. We are convinced that there will be an over-all net increase in aviation gasoline availability as a result of this order.

We would like to point out that during the month of September, when this order was not in effect, 15,600 barrels per day out of a total of 32,600 barrels per day, or nearly 50 percent of the 100-octane-number aviation gasoline that was shipped from this country to foreign areas, contained 4.6 milliliters tetraethyl-lead per gallon. Revision of the order would not affect these shipments. Further, all high-octane-number aviation gasoline except grade 108/135 that is produced in foreign areas, and is outside the jurisdiction of PAD Order No. 4, amounting to about 20,000 barrels per day, is now being produced with 4.6 milliliters tetraethyl-lead per gallon. Modifying the order would therefore only affect the lead content of one-third of the gasoline available outside of the United States, its possessions, and Territories.

Sincerely yours,

BRUCE K. BROWN, *Deputy Administrator.*